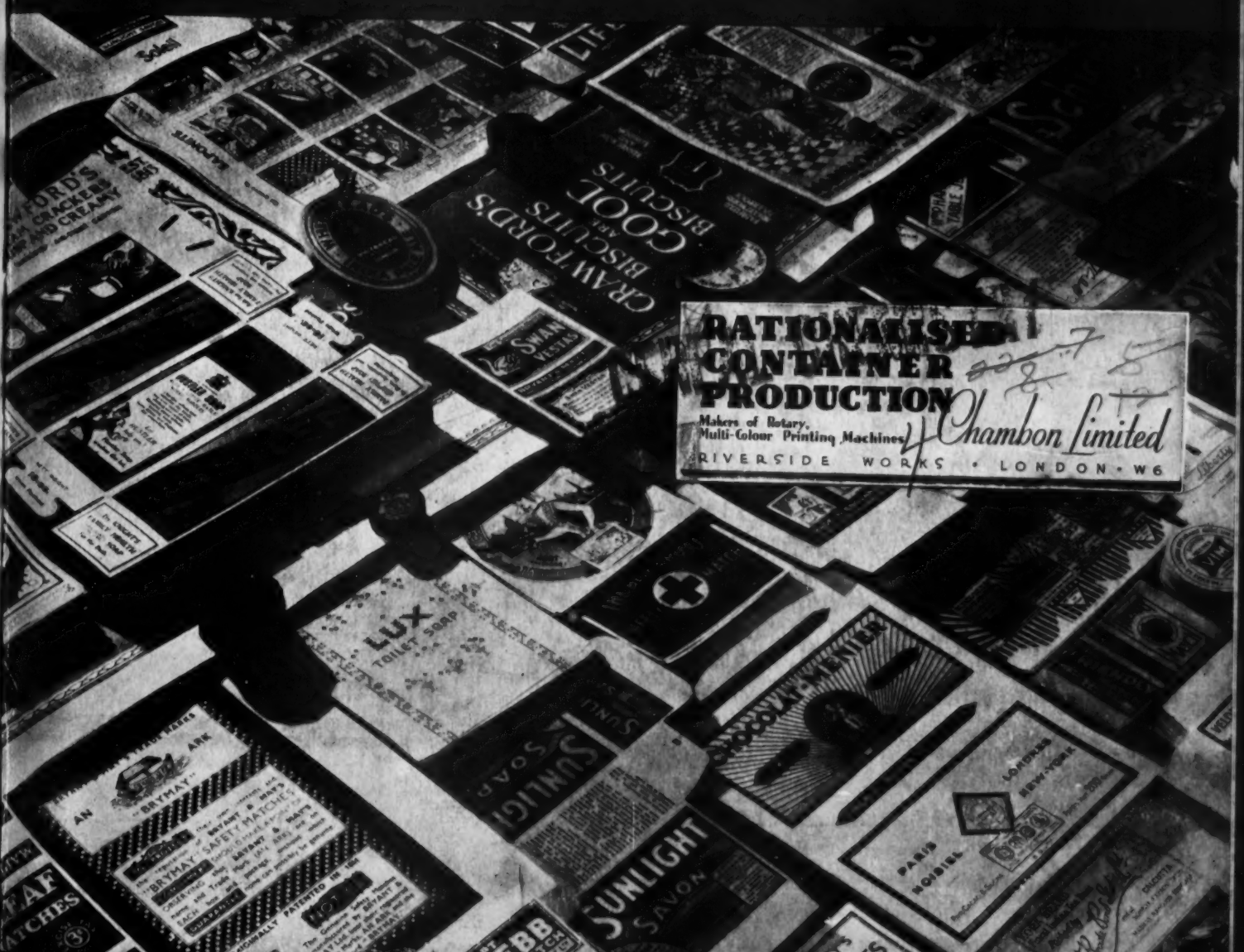
FOOD MANUFACTURE



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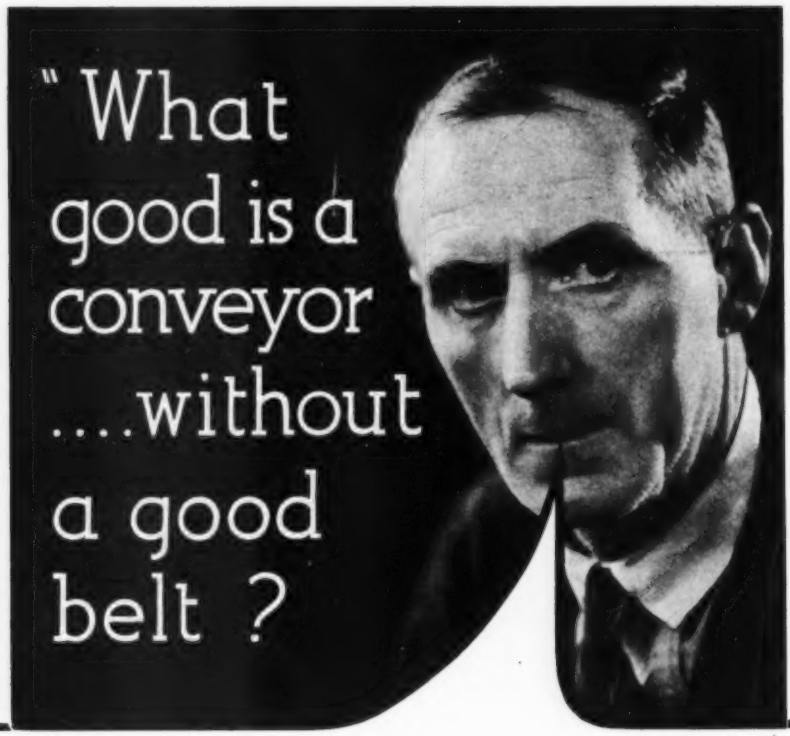
MANAGING EDITOR: G. W. Lacey, B.Sc., A.I.C.



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FOOD MANUFACTURE

Vol. XI, No. 4 April, 1936

Food Supplies in the Event of War

IN THESE days of international disagreement and everlasting talk about armaments and defence, security against air attack and gas attack and the maintenance of the long lines of Empire communication by which the great bulk of our food supplies are brought to us, it is amazing, not to say appalling, to think that whilst White Papers are being published about increasing expenditure upon defence forces, and a Minister for the Co-ordination of Defence has been appointed, nothing is being done to mobilise our food supplies in the form of reserves against the possibility of another war that may last for years. A blockade of this country may even be more severe than was brought about by the submarine campaign in the Great War of 1914-18. On the other hand, it may be argued that modern methods of destruction are so swift in their action and so deadly that a war may soon be decided one way or the other in favour of the one who possesses the most up-to-date mechanical devices. But the ingenuity of man when up against the most fearful odds is stupendous. Antidotes for new weapons of attack are always invented with astonishing rapidity in times of stress. And it is the production of new weapons and their antidotes that prolongs the catastrophe and increases the devastating mental and physical effects of reduced food rations and the imminence of starvation that are the inevitable accompaniment of war.

The use of such strong words will be understood by everyone interested in the supply and manufacture of food products. It is so characteristic of Governments of this nation to delay essential action until the last moment and to leave the obvious forms of protection uncared for. It is imperative that we should carry stocks of foodstuffs adequate to withstand a protracted siege. It would be the most powerful bulwark of defence, and it is not only possible to do so, but, with the tremendous advancement in scientific methods of storage and packing of foodstuffs, it is perfectly practicable. Accordingly we have invited Mr. T. H. Fairbrother, whose authority to write on this subject requires no qualification, to examine the possibilities of creating large food reserves, which he does in a challenging article published on page 121.

Mr. Fairbrother first opened the discussion of this subject in an article in *Food Industries Weekly* on November 1 last year. On March 17 this year *The Times* published a leading article entitled "Food Production and Defence". This stressed the need for a well-considered plan for increasing food supplies produced in this country, which point Mr. Lloyd George also made in his speech in the debate in the House of Commons on the Defence Proposals. *The Times* also recognises that the crux of the problem is the organisation of storage, a continuous turning over of stocks "and therefore an organisation which, if it did not direct, would have to be careful not to upset the course of prices".

There is no need for panic. We do not think war will come yet. We hope it will never come to us again. But, as *The Times* points out, "the problem of defence is not ephemeral". We are convinced that there is as much urgency for building up our reserves of food as the strengthening of our weapons of defence. We ought to have a Ministry for the Co-ordination of Food Supplies, which, in our opinion, is justifiable in this country even in times of comparative peace. It should not be an elaborated Ministry of Agriculture to "marry agriculture and defence". We cannot produce all we need to live on by any means. We may not have derived great benefit from Government control or intervention, and there are many, no doubt, who would point to disastrous effects in some directions. But that is due to *lack* of co-ordination. With competent scientific and economic advisers it should be possible to organise on a national scale the provision of adequate supplies of essential foods in the fresh, processed and preserved states for everyone and at the same time to accumulate reserves against any calamity. We shall welcome expressions of views on this topic from those con-

nected either directly or remotely with the great group of food industries which we serve.

Nutrition and National Health

Nutrition and its relation to health is being more and more discussed every day. Soon the mass of the people themselves will become conscious that there are other things they are not getting to which they are fully entitled. Food manufacturers should take note of the work on nutrition that is being done in this country and throughout the world. Since last month Sir John Orr has issued what he describes as "A challenge to the nation : to improve the health of the rising generation ". It is in fact a survey of adequacy and diet in relation to income and is entitled, " Food, Health and Income". The book constitutes the first attempt at surveying the diet of a whole nation, and in the compiling of it Sir John Orr has gathered together the forces of nutritional experts, economists, and statisticians. It appeals to everyone, but food manufacturers should make themselves acquainted with its implications. The Report of the Medical Research Council for the year 1934-35, which has just been issued, also devotes quite a large amount of its space to consideration of the application of modern knowledge of nutrition. For a number of years now the Council working through their Accessory Food Factors Committee have initiated and financially supported investigations with the object of standardising the different vitamins. As a result people throughout the world can discuss vitamins in terms of units in the same way, the report says, as they can discuss time and distance in units of hours and metres. The broad requirements of proper nutrition are stated simply as " much more milk (' safe ' milk), cheese, butter, eggs (especially egg-yolk) and vegetables (especially green vegetables)". Both of these publications are reviewed more fully elsewhere in our pages.

Vitamin Pills

Recently, under the name " Multivite Pellets ", chocolate covered pills have been placed on the market by the British Drug Houses, Limited. They contain vitamin A. B_1, B_2, C, and D. In offering these for sale the manufacturers quote the following statement : " The interest which vitamins hold for the physician is not alone in their relation to certain well-defined diseases . . . but rather in the fact that chronic vitamin deficiency produces numerous vague, borderline states of ill-health which often puzzle the physician and disable the patient ". The manufacturers say that it is impossible to ensure that the normal daily dietary under modern conditions is rich in the necessary vitamins, and they mention gastric distension, constipation, nervous disorders, dental decay, certain forms of anæmia among other conditions as being the results of slight but general vitamin deficiency. The Multivite Pellets have been produced to meet the demand for a well-balanced vitamin concentrate convenient for use in private practice and in hospitals. Each pellet contains 3,000 international units of vitamin A, 100 units vitamin C, 600 of vitamin D, while the vitamin B complex is equivalent to 2·0 grams of distillers' yeast. These pellets should prove very valuable, but as we have repeatedly pointed out any dosage of vitamin concentrates should only be made under the careful supervision of a physician—it is possible to have too many vitamins.

Canned Beer

We might preface our remarks on this subject by saying that fools rush in where angels fear to tread. At any rate, we have not rushed in yet, and we do not intend to. There is a considerable amount of mystery surrounding the canned beer developments in this country. We have heard of sales amounting to many millions of cans in the U.S.A., and we have heard a rumour also of a big drop in sales in some states in the same country. There have been technical difficulties which, we have been told, have been overcome in the U.S.A. We have tasted American beer out of cans and did not think much of it. But, then, we did not expect to. We are connoisseurs of beer, whereas the Americans are not. There is quite a considerable difference between American and English beer too. Yet there is more in it than that. We have been accustomed to drinking our beer for a very long time either from the barrel or from a bottle. The former tends to improve the flavour, whilst the latter certainly has no ill-effect upon it. Woebetide the brewer who puts his beer in a can from which it does not come out quite so good as usual. " No tampering with our beer ! " is likely to be a national exclamation. In any case, the psychological reaction to beer in a can will be something to reckon with, and probably a much greater factor than is expected. In the U.S.A. everyone seems to try anything new. Here we have to try it on the dog first. So the delay in introducing canned beer to the public in this country is a very wise one. It should be well tried first, and the innate conservatism of the brewers can be trusted to do that. We

shall undoubtedly have beer in cans, and it will be a very suitable package for export, but we shall still have beer in barrels and in bottles.

New Fruit Products

There was a distinguished gathering of experts in the food industries, and officials of the Ministry of Agriculture, at the Long Ashton Agricultural and Horticultural Research Station, near Bristol, on Wednesday, March 11, for the first demonstration of the new fruit products that have been developed there by Mr. V. L. S. Charley, who is in charge of this branch of the station's activities, under the direction of Professor B. T. P. Barker. Visitors were able to taste samples of the products which were set out in different rooms in the station. Professor Barker and Mr. Charley were kept very busy answering numerous enquiries, and they are to be complimented on the success of the meeting, which we found extremely interesting and very enjoyable. The ultimate objective of this work is to open up new outlets for fruit in addition to those already existing, through the fresh fruit markets and the fruit canning and jam industries. It is hoped to raise the standard of the fresh fruit market by developing new uses for some of the lower grades of fruit at present appearing on that market, to ensure that the grower can dispose of all his fruit and minimise the wastage hitherto associated with glut crops.

Research work has been largely directed towards discovering what types of products offer most promise of achieving those objects by their attractiveness and commercial value. The exhibits were divided into seven sections as follows : Fruit Syrups, Fruit Squashes, Fruit Wines, Liqueurs, Non-alcoholic Apple Juice Beverages, Milk Shakes, and Ices, the two latter, of course, incorporating fruit syrups. There is no doubt that the original fruit flavours have been exceptionally well retained in the syrups and squashes, and some of them are really delightful to taste. Naturally some of us do not like one fruit as much as another. There is no lack of variety in the fruits from which products have been made, for these include strawberry, raspberry, blackcurrant, loganberry, red gooseberry, white gooseberry, whortleberry, youngberry, and tomato. One would expect the loganberry to be inferior in flavour to the raspberry, but the youngberry and whortleberry (or bilberry) are quite intriguing. The names of these, however, may go against them achieving popularity because they are unfamiliar. It would be interesting to know the vitamin and mineral salt contents.

The unfermented apple juice beverages possess a very attractive bouquet without the usual sharpness of cider. The Fruit Wines and Liqueurs did not interest us quite so much, perhaps because they are a little out of our field and because by the time we came to taste them we had already spoiled our palate for the more subtle sherry flavour of the wines and the heaviness of the liqueurs. The latter, nevertheless, seemed to possess all the other characteristics one associates with a liqueur. Owing to the interest aroused by these products, we have asked Mr. Charley specially to describe their development, production and application for FOOD MANUFACTURE, and his article will appear next month.

The Staff of Life

Under the cover of this time-honoured and respected title, an article has been written and, strangely enough, published in a recent issue of *Heal Thyself*. This is a publication that purports to give advise on matters of living and methods of avoiding death prematurely. Its precepts would, therefore, appear laudable. Any journal, however prejudiced and dominated by preconceived notions it may be, should at least make some effort to check up the statements of its contributors and present to its readers accurate facts and conceptions. In the article to which we refer yet another attempt has been made to discredit white bread and to eulogise wholemeal products. We are not particularly concerned with the white and brown bread controversy. We believe that both have their virtues and their shortcomings, but in any discussions about them we would commend truth of statement and freedom from bias. Our sense of scientific accuracy makes us shudder when we read statements like this: "So that it will keep like ordinary white flour—*pure starch*—has the reputation of doing". One would have thought that anyone endowed with the temerity to write an article for a journal dealing with the problems of health and nutrition would at least have made himself acquainted with even a general conception of the composition of flour—be it white or brown.

Loose Statements

The whole article is written in a vague and unconvincing manner. Its author takes the trouble to refer to the Bible in support of one of his arguments, and yet admits that he put himself to the great personal inconvenience of living for a fort-

night on a diet of white bread and water. Possibly a more enlightened student of the Bible would have remembered that "man cannot live by bread alone", and one wonders why anyone should ever attempt such a curious experiment, made, as we are told, in mid-winter. We are not surprised that the unfortunate experimenter suffered "most severely from hunger, constipation, fatigue, weakness, cold, loss of sleep and weight, and almost gave it up in despair of even lasting out the fourteen days". It must have been, indeed, fourteen days' hard labour without any option at all! We are intrigued by the suggestion that the only way to get "the genuine article—pure, wholesome bread" is to obtain "cleaned white wheat and a hand mill and grind it oneself and bake the bread at home", but, before undertaking the experiment, we would seek further information about the aforesaid hand mill, how we could be convinced that the wheat was cleaned, and, of all things, why should we have to use "white" wheat? Couldn't we try just a little Yeoman, Little Tich, or even Squarehead Master now and again? We do not ask our readers to take these comments too seriously: all we hope is that they will not take articles such as the one we have referred to at the expense of much valuable space seriously at all. Problems of diet, nutrition, and public health must be dealt with dispassionately and truthfully. No service to humanity is being rendered by sensational doctrinarians; much more is being done by sensible doctors, who, at least, are trying to apply the principles of scientific truth to the alleviation of human suffering.

Wrappings for Foods

We are pleased to note that public attention is being drawn to the common practice of wrapping up fish and meat in retail shops in old newspapers. We do not include the familiar "fish and chips" in this! We were very gratified to read that Mr. H. G. Williams, in the House of Commons, asked the Minister of Health if he was aware of the practice among retail butchers and fishmongers of purchasing old newspapers, which might be contaminated and carriers of disease, for the purpose of wrapping up meat and fish sold in retail shops, and whether he would take steps to make this practice illegal, and ensure the use of *clean* greaseproof paper for these purposes. The answer was most disappointing, if thoroughly in keeping with what one expects from politicians! Mr. Shakespeare said: "My right hon. friend is aware of this practice, which on general grounds of cleanliness is to be deprecated, but he is advised that there is no definite evidence that the wrapping of meat or fish in newspapers is a factor in the spread of disease, and he would not, therefore, be justified in taking the steps suggested". A more inadequate answer could scarcely be imagined. Newspapers go into all sorts of hovels, railway carriages, sick rooms, and numerous other doubtful places, and should certainly be used for no further purpose than lighting the kitchen fire—they should not even be used, as we fear is often the case, for covering the pantry shelves. Give us the wholesome German love for clean, scrubbed, bare wood instead of the dirty, dusty newspaper covered shelves so prevalent in England. Mr. Williams got an unsatisfactory answer, but he has raised a problem and may have set the ball rolling in the right direction.

Stinking Fish

A rather curious prosecution was instituted at Tower Bridge Police Court recently when three companies were fined for the sale of a "certain potato preparation" in contravention of the Public Health (Preservative, etc., in Food) Regulations. The actual question at issue was whether the wording of the label would be likely to lead to an offence, inasmuch as the preparation contained sulphur dioxide. Apparently the label made reference to the washing, but not to the cooking of fish, and the preparation was described as a "powerful deodorant". It was stated that if fish were fried after treatment with the preparation, or were washed whole, no sulphur dioxide could be found, but if fillets of cod were washed in the preparation and analysed without cooking, sulphur dioxide was revealed in minute quantities. As far as we can gather, the significance of the matter lay not so much in the quantity of preservative as in the possibility that its use may lead to the consumption of unwholesome fish, since the preparation was capable of masking the evidence of putrefaction by removing any objectionable smell. The defendants had to admit that the label might lead to the sale of uncooked fish containing prohibited preservative and a formal plea of guilty was entered. This case opens up a rather nice point—if it can be proved that in the normal processes of cooking all traces of preservative are removed (and apparently it was), is the offence one to be dealt with under this particular Act? We very much doubt whether any sulphur dioxide preparation would effectively disguise really putrid fish, but it might prevent the fish becoming bad, in which case its use would be beneficial rather than a misdemeanour.

ARE WE PREPARED?

Food Reserves in Case of War

By T. H. FAIRBROTHER, M.Sc., F.I.C.

"*AND JOSEPH said unto Pharaoh, the seven good kine are seven years; and the seven good ears are seven years: the dream is one. And the seven lean and ill-favoured kine that came up after them are seven years; and also the seven empty ears, blasted with the east wind, they shall be seven years of famine. . . . Now therefore let Pharaoh look out a man discreet and wise, and set him over the land of Egypt. And let him appoint overseers over the land, and take up the fifth part of the land of Egypt in the seven plenteous years. And let them gather all the food of these good years that come, and lay up corn under the hand of Pharaoh for food in the cities, and let them keep it. And the food shall be for a store to the land against the seven years of famine, that the land shall not perish through the famine.*" It is many years since Joseph interpreted the dreams of Pharaoh and gave him the sage counsel that saved both Egypt and Joseph. Most people have read, or have had read to them, the forty-first and forty-second chapters of the Book of Genesis, yet how few of us have realised that those chapters bear a message to us as clear and clarion toned as it was to Pharaoh? Pharaoh's ears heard the warning, and, with laudable promptitude, the king took action. During 1914-18 we were visited by no mere dream, but a horrible nightmare, so hideous and foul that its memories still bring shudders down the spine, and yet the lessons it should have taught us have gone unheeded, and if we were again flung into conditions of war and blockade we should be just as helpless and unprovided as we were in 1914. Can anyone remember those years of rationing, of food cards and food control, with attendant malnutrition and malpractices, and remain unmoved? Some people starved while others made fortunes out of the needs of their fellows. Possibly the grim lessons of the last war have been overlooked or shirked by the false faith in the power of the League of Nations. Because we like neither war nor the conditions imposed on us by a state of war, we have deliberately shut our eyes to the possibility of another one. We have buried our heads in the sands and wallowed in a fool's paradise. Events have shown that the League of Nations has not been able to prevent war or rumours of war. To-day two nations, both members of it, are fighting each other. In addition to this, Germany has ignored her treaty obligations and made a demonstration of armed force for all the world to see. She has flaunted her weapons of war in the eyes of peace-desiring nations and goose-stepped her troops arrogantly through an area she promised to keep demilitarised. Germany had the decency to get out of the League of Nations before adopting her present militaristic efforts, but the fact remains that the atmosphere in Europe is dark and heavy with the clouds of war. Somewhat late in the day our Government have realised that there is need for action. We may not become directly embroiled in another European war, though it is difficult to see how we shall keep out of one if, say, France or Belgium are attacked, but in any event we should be indirectly involved.

Food, not Gun Fodder!

Having come to this conclusion, the Government have decided to spend a very large sum of money on measures of defence. Have they paid any attention to the question of food supplies in case we become involved in another war? Surely this is as important a matter as the provision of airplanes, submarines, tanks, and the like. While not for one moment deprecating the importance of any measures of defence, the object of this article is to stress the fact that the provision of an adequate food supply is as essential as any other problem. A number of people (mainly professional politicians in the Opposi-

We acknowledge the lower central photograph in the composite heading illustration to the London Film Productions Ltd., it being taken from the film "The Shape of Things to Come", and the one above it to "The Aeroplane".

tion, who oppose any Government proposal on principle) have urged that the proposed measures for defence are a direct incitement to war. Nothing could be more absurd. One might as well say that the provision of an adequate police force is a direct incitement to crime. Those of us who remember the police strike in Liverpool a few years ago understand what the absence of a police force meant. Every possible form of crime and debauchery sprang up immediately.

In the same way an unprotected Britain would not only be an incitement to war, but a direct invitation for some other nation to step in and take possession. Having taken it for granted that most people are in agreement with the measures of defence, and also assuming it to be axiomatic that provision of food reserves is an integral part of defence, let us briefly inquire into the ways and means of attacking a somewhat difficult and involved problem. It will not be possible to enter into minute details, as the field is wide and embraces many interests, the co-ordination of which will require much careful thought and judgment. All that will be attempted is a broad survey of the general principles, and it is to be hoped that the matter will be taken up by specialists in the different sections of food production.

Wheat

As bread can be regarded as the basic stratum of the average diet of human beings, perhaps the problem of wheat may be dealt with first. The provision of an adequate supply of wheat is important to all nations, but it is much more vital in Great Britain than is the case with other nations, who are bigger producers. Great Britain has a large population of relatively big bread eaters. Her industrial population, in comparison with the agricultural section of the community, is probably greater than that of any other nation. Wheat cultivation, at its maximum, in Great Britain is able to provide about a quarter of the requirements. It is a well-known and acknowledged fact that this country can never be self-supporting as far as wheat is concerned, and will always have to supplement home-grown corn with colonial or foreign wheat. In the event of a blockade, therefore, one of the first pinches to be felt would be a shortage of bread, and it would appear reasonable to suggest that one of the first items that should be put on the "food defence agenda" is the provision of an adequate reserve of good millable wheat in this country. The total supplies of wheat, home grown and imported, available in the United Kingdom in recent years have varied between 6 and 7 million tons. Of this about 1½ to 2 million tons are or could be, produced at home. Thus about 4½ million tons of wheat a year are required from outside. To be prepared, therefore, for a blockade of, say, three years a reserve of 15 million tons of foreign wheat ought to be stored in Great Britain. The writer is well aware that he will be accused of indulging in fantastic theories, but, after all, the whole idea of war is fantastic, and, in times of revolution, revolutionary ideas are needed. It should not be an impossible task to achieve this amount of storage, nor need it be a definite waste of money, as is the case with ships that become obsolete or explosives that are dissipated to the four winds. It ought to be possible for the Government to make themselves responsible for the purchase and storage of as much wheat (up to 15 million tons) as they can procure. That would provide the three years' supplies. In each succeeding year one-third of this would be passed on at cost to the milling industry of this country, and an equivalent amount of fresh wheat purchased and put into store. One would imagine that the milling interests in this country would readily co-operate with the Government in such a scheme, provided always that the wheat released was clean and had not deteriorated during its period of storage.

Storage

This brings us to the vital question of how the wheat is to be stored and kept sweet and millable, free from vermin and the attendant damage caused by the attacks of weevils or other pests. To judge from the passage quoted at the beginning of this article from Genesis, Joseph and Pharaoh had no qualms about storage; their main concern was the acquisition of enough corn before the shortage came. In ancient times wheat was stored for long periods in airtight pits; such storage is even practised to-day in India, Malta, and other Oriental countries.

The principle involved in airtight storage is that the natural respiration of wheat soon produces a concentration of carbon dioxide, thus inhibiting the development of weevils and other pests that might attack the wheat and, during prolonged storage, could cause much damage and deterioration. There is no need, however, to wait for the concentration of carbon di-oxide to be produced by the respiration of the wheat. Modern science has made the commercial production of solid carbon di-oxide possible, and this could be used to create an atmosphere of carbon dioxide in the pits or receptacles in which the wheat is to be stored. According to one patent taken out recently, the conditions of grain storage in ship's holds or in silos are improved by mixing 10 cwt. of solid carbon dioxide with 214 tons of grain. The solid carbon dioxide and the grain are added simultaneously to the silo, and the carbon dioxide is so distributed that there is a greater concentration towards the top of the silo. The grain may thus be stored at about 18·5° C. in an atmosphere of carbon di-oxide so that the growth of weevils, etc., is arrested.

Distribution of Stores

It would not be advisable to have these "national reserve supplies" housed in huge silos in special areas, as these would be obvious targets for enemy aircraft. There are two possible alternatives: either use could be made of disused mine shafts, such as the old tin mines in Cornwall or old colliery workings in different parts of the country, or an arrangement could be made between the Government and all millers whereby the latter would be provided with additional storage capacity and would each hold a stock of the Government's reserve wheat, not to be used without instructions from the authorities. It is no purpose of this article to enter into details; it is

only the general principle that matters. With all the resources of modern science and engineering it should be possible to store wheat for several years in perfectly good condition. This being the case, it surely ought to be one of the Government's main items of defence to explore the whole situation and make a start on this important problem as soon as possible.

Canned and Preserved Foods

To quote again from the Bible—that storehouse of all wisdom—man cannot live by bread alone, and, while an adequate surplus of wheat is necessary, attention should also be paid to other foods. The question of wheat has been dealt with at some length because many of the problems involved in this case are closely related to those of other foods, but in the consideration of the supply of the bread one must not lose sight of the butter and the jam. The present issue of FOOD MANUFACTURE deals with various aspects of the canning industry. The progress that has been made in recent years in this important section of food processing is considerable. The day when canned goods were regarded with suspicion has passed away, and it is doubtful if to-day there is a single household in the country without a can of something or other on the pantry shelves. Canning research has made it possible to preserve fruits and vegetables in such a manner that it is almost impossible to differentiate them from fresh products. In any case, the differences that may be noticeable are merely as to colour and slight flavour; nutritionally there is little or no difference. It is now possible to eat green peas, asparagus, etc., at Christmas or at any other desired time. It should be possible to build up reserves of canned goods—not only fruit and vegetables, but also meats, fish, and extracts. Science has opened up a new conception of food canning, and laborious and painstaking research, such as that carried out by Mr. Hirst and his colleagues at Campden, has gradually eliminated the snags and pitfalls that at one time caused much trouble. There does not seem any reason why an adequate surplus of these foods should not be built up.

Milk and Butter

These come into rather a different category, and it will for a long time yet be preferable to have available fresh supplies of milk and butter. For that reason the writer would advocate a greater acreage to be devoted to dairy farming at the expense of cereals, as these can be stored more conveniently. At the same time factories should be built for the production of condensed and dried milk and a surplus of this accumulated for use in the confectionery industry and direct consumption. In case of blockade, most of the milk produced would be needed for liquid consumption or cheese and butter making, and the surplus requirements for other purposes should be accumulated in peace times. In the case of butter, while to most people the fresh article is, and will be for a long time, preferable to the synthetic variety, there is no doubt at all that the latter type can be made wholesome, palatable, and nutritious.

Vitamin Supplies

The writer has been informed that certain synthetic butters have been "tried on" persons with acknowledged sensitive palates, and that they have been found to be indistinguishable from natural butters. Be that as it may, there is no time in a state of blockade to be finicky about flavour, and if a supply of wholesome and nutritious butter of any origin is available, a great problem in food supply will have been solved. This would obviously involve a supply and surplus of the necessary vitamins which give to natural butter just that little bit of something that the ordinary synthetic ones haven't got. This question of supplies of vitamins leads us to the very important problems of nutrition and the need for more intensive research in this field. Much attention has been paid to this by scientists all over the world, and the League of Nations has made valuable contributions to our knowledge in this direction. The main point to be ascertained is the minimum amounts of various substances that are absolutely necessary for a complete functioning of the human body, so as to keep both mind and body healthy and active. The Government have done something, one must admit, in the encouragement of further nutritional studies, but by no means enough, and it should be one of their first concerns to finance and foster further research on the essential requirements of a healthy body.

Having discovered this, the next step would be to investigate methods for preparing these essential food factors—either synthetically (as has been found possible in the case of some vitamins) or by obtaining concentrates in large quantities that can be kept fresh and active for a long time. It will always be admitted that the same æsthetic pleasure will never be derived from the consumption of a capsule containing an equivalent amount of antiscorbutic principle as would be from the consumption of a juicy orange from Cyprus, but again in times of stress matters of flavour and other æsthetic considerations must be put into the background and only essential health factors considered.

Sugar

One of the most fruitful sources of grumbling in the last war was the shortage of sugar, and in the provisions for the future attention should be paid to adequate stocks of sugar. In view of all the circumstances, one can scarcely recommend an increase in the acreage under sugar beet; this has been repeatedly proved to be an uneconomic proposition. The existing sugar beet farming in this country has been maintained by a further subsidy, and this would provide a nucleus for an emergency supply. In addition to this, a reserve stock of refined sugar should be built up from imported sugar. In cases where sugar is merely used as a sweetening agent for the delectation of the palate, synthetic products could be used, and attention should be paid to plants for the manufacture of saccharine and other similar substances. One must not overlook the calorific value of sugar and its energy producing capacity, and if sugar is to be replaced by non-carbohydrate synthetic substances the body's fuel must be supplied in some other way—by

extra starch, either as bread or potatoes. It would never be possible to replace all sugar by synthetics—the canning and preserving industries will always require real sugar—but undoubtedly a certain amount could be eliminated in other directions. The provision of enough real sugar and sufficient substitutes should be an important consideration in the whole general policy of food provision.

Enough has been said in this article to show that a definite portion of our national defence programme should be adequate food reserves—both as actual food and potential plant for producing synthetically those food principles that are now only obtainable from other sources. Something has also been said regarding the possible practical methods for achieving this. Obviously this is incomplete and inadequate; it is a wide field and a big subject, and as such is worthy of intensive consideration. The need is urgent and the possibilities are great. Will the Government seize the possibilities and fulfil the need?

NEW BRITISH STANDARD SPECIFICATIONS

For Distillation Apparatus

The British Standards Institution has just issued a British Standard Specification for Distillation Apparatus, No. 658, 1936.

The first part of the specification specifies in detail the component parts of the apparatus. The assembly of the apparatus is next dealt with and diagrams show the assembly for each of four different types of condenser provided. The specification goes on to state that since the appropriate assembly of apparatus and detailed procedure for carrying out a distillation differs for different liquids and differs also with the object in view in carrying out the distillation, reference should be made to the appropriate British Standard Specification for details applicable to any particular liquid.

An appendix is given dealing with the correction of barometric readings to standard conditions.

It is also stated that by making suitable choice in the assembly of the component parts specified, adequate provision can be made for a wide range of distillations, including many of industrial importance.

For Bacteriological Test Tubes, Durham Fermentation and Dreyer Agglutination Tubes

The British Standard Specification which has just been issued for Bacteriological Test Tubes, Durham Fermentation and Dreyer Agglutination Tubes (No. 625, 1935) specifies the dimensions of the tubes, the finish and general quality. A system of numbering the standard sizes has been adopted which will allow for the interpolation, as and when they are required, of other sizes in their appropriate places in the range. The nominal size adopted provides a ready means of identification of the size of the tube. The identification number of each tube is a combination of its length and approximate external diameter expressed in millimetres.

Copies of these Specifications may be obtained from the Publications Department, British Standards Institution, 23, Victoria Street, London, S.W. 1, price 2s. 2d. post free.

SOCIETY OF PUBLIC ANALYSTS

At a dinner of the Society of Public Analysts held at the Trocadero Restaurant on March 6, the Rt. Hon. Sir Kingsley Wood, P.C., M.P. (Minister of Health), said that the extensive plans for the public health services formulated by the Government in their programme at the last election were being completely pursued.

He also said that the consumption of food in the United Kingdom had grown considerably, and had probably reached a figure of over 25,000,000 tons a year. Every year we consumed 533,000 tons of butter, 886,000,000 gallons of milk, and 202,000 tons of cheese (to refer particularly to the group of foods for the purity of which the analyst was, in a specially large degree, responsible). He did not hesitate to say that for many years the analyst had been the chief defender of the people's food, and he would add that, with the advance of modern food chemistry, his work had not grown less or become easier.

Without doubt, in recent years there had been a considerable improvement in our food standards in this country, and he wished to testify that it had been achieved very largely by the work of the health authorities and their professional advisers. There was no doubt that in past years food frauds were rampant in this country, as might be gathered from the realistic and rather horrifying account of the state of impurity of food in this country published by Frederick Accum in 1820.

Largely owing to the work of many men present that evening there was now very little gross adulteration or substitution of one article for another. Last year over 140,000 samples were submitted to Public Analysts (the highest on record), and those adulterated or not up to standard represented a little over 5 per cent.

They had to be vigilant to see that the public had some sort of guarantee that it was getting what it asked and paid for and that the food did not contain any ingredients that were injurious to health. The consumer's interest must come first, both from the point of view of fair trading and of good health.

The CANNING and BOTTLING of ASPARAGUS

AT THIS time of the year, although the vegetable canning season is some distance away, in certain agricultural centres the thoughts of canners turn to asparagus. Although in America most of the asparagus that is packed is canned, in this country the greatest proportion is bottled. Asparagus is only grown in a few districts, and the supply, which is largely produced for the fresh market, is very limited. Asparagus, however, lends itself to preserving very well, and with the possible exception of peas, it provides, in the writer's opinion, one of the best English vegetable packs. Large quantities of preserved asparagus are imported each year from the United States and from France or Italy. A large proportion of this is of the so-called "white" variety, whilst that which is canned or bottled in England is almost exclusively the green type.

Growing

Asparagus is not grown in this country in large quantities, but is chiefly confined to the small market gardener, who may have, at the most, an acre or two of asparagus under cultivation. The main necessity for asparagus growing is an abundant supply of water, and in many cases this means that some artificial way of supplying water in the summer has to be provided.

Without going too far into the details of cultivation, which would be of interest only to actual growers, it may be useful, in order to obtain a fuller appreciation of the process of preserving, to give just a rough outline of the cultivation. As so often occurs in the fruit-growing business, a grower has several years of very little or no return for his outlay, until the crop reaches a mature stage. It is roughly four to five years after drilling the seed before a reasonable crop is obtained, and although a good bed may last for a further ten or more years, these first five years have an economical bearing on the asparagus market from the canner's point of view.

It should be borne in mind that asparagus as we know it is really not a direct product of nature, but is an example of what can be achieved by intense and specialised cultivation. The asparagus plant or "fern" tends to grow with quite a short stumpy stem under normal conditions, but when planted deep in the ground—say, 10 or 12 inches—this stem lengthens and remains colourless, except when the shoot or "spear" peeps out of the soil and is exposed to sunlight. This lengthened stem, with the green or slightly purple "spearhead", is known in the trade as the "grass", and in order to keep it bleached free from colour it is continually earthed up during growth, in a similar way to what potatoes are. The more earthing up that is done, the longer and more slender does the "grass" become. If entirely white asparagus, similar to the Continental type, is required, the earthing up should be conducted so that the "spear" never appears above the ground at all. In this way an asparagus shoot can easily penetrate 10 or 12 inches of soil without bending. In the spring the asparagus is cut deep down in the soil by special knives, and in the United States it is the practice to wash the "grass" immediately it is cut in the field. If this is not done, the soil may stain the asparagus permanently, so that it cannot be cleaned in the factory to make it sufficiently white for canning or bottling.

Preparation

From the above remarks on growing it will be seen that there is considerable labour required in cultivating asparagus, and the same is also true of its preparation for canning or bottling. Machine handling is very difficult, or impracticable to a large extent. The asparagus generally arrives at the cannery roughly washed, and it is carefully packed in round baskets with the "spears" all facing towards the centre.

Sorting Asparagus over Gravity Conveyors at the Asparagus Grading Pool of Littleton and Badsey Growers, Ltd., Badsey, Vale of Evesham, England.

The first operation is that of cleaning, which is usually done in tanks containing cold or slightly warm water. The "grass" has to be handled very carefully during this process, as the "spears" are very delicate. After washing, the "grass" is graded for size—*i.e.*, thickness of

stalk—and at the same time any that are discoloured or stained are sorted out. Generally it is sufficient to sort into three grades—large, medium and small—which are then placed together and tied into bundles of 20 or 30. They are then cut to the correct length in asparagus cutters.

This cutting to length is an important point, particularly in bottling, as there is a shrinkage in length after processing. Therefore, in order to avoid any undue risk of damage due to vibration in transit, the stalks should be left as long as possible. On the other hand, if they are too long, the operation of sealing the bottles may be seriously affected. Stalks (or "soup-cuts" as they are called) are trimmed to such a length that the "grass" is only about $\frac{1}{8}$ inch shorter than the length of the bottle.

Blanching

After grading and cutting, the "grass" is blanched in boiling water for three minutes. With young and tender material this three minutes' blanch in boiling water would make the "spears" so fragile that it would be impossible to pack them without considerable disintegration. Therefore, the bundled "grass" is placed in shallow woven wire trays, fitted with lids, and immersed in the blanching tanks, so that the water does not reach the "spearheads"; only momentarily is the whole of the "grass" immersed. Immediately after blanching, the baskets are withdrawn and immersed in cold water.

It is important that this cooling should be done immediately after the blanching, as here, too, it is very easy to over-cook the asparagus, with the result that it is impossible to produce a "quality" pack. The blanching water must not be too alkaline, otherwise the asparagus may become stained. Therefore, in factories where the water is unduly hard (above about 15°), it is advisable to add a small amount of citric acid to the tank liquor, in order to correct the alkalinity and to ensure that this staining does not occur.

Filling

The asparagus is then carefully filled into bottles, with the "spearheads" pointing towards the bottom. It should not be forced in, as after blanching it is rather delicate, and it is very easy to break the tips. Up to the stage of filling, the various grades should be kept separate, but, when filled, the bottles are usually not segregated into various grades. The amount filled in each bottle will, of course, depend upon the grade, but in the standard bottle it varies from about 10 pieces for the large grade to as many as 30 for the smaller grade.

Although with soft water it is not essential to acidify the brine, the staining effect which was mentioned in connection with blanching is also liable to occur during processing, if the acidity is too low. It has been found in America that the critical *p*H above which staining is likely to occur is about 6·1. As the final *p*H of the liquor is only slightly more acid than this, most packers consider it advisable to add a certain amount of citric acid to the brine, in order to adjust the *p*H to about 5·5, which will allow an ample safety margin. For soft waters, about 0·05 per cent. of citric acid is sufficient to add to the brine, but with harder waters this amount may require to be doubled. Further, this increase in acidity is a considerable help in sterilisation, and it affords a protection against bacterial spoilage and fermentation.

The strength of brine used for asparagus varies considerably, some packers using 2 per cent. of brine and others twice this amount. After filling with hot brine (180° F.), the bottles are exhausted for four to six minutes in an ordinary exhaust box at 180° to 200° F. The bottles are then immediately closed with a metal cap and passed to the retort for processing.

If the asparagus is being canned instead of bottled, the operation is much the same, but square cans should be used, as this enables the canner to make a much more compact pack than if the ordinary round cans were used. In any case, it should be the object of the factory to fill as compactly as possible, in order that the damage in transit may be reduced to a minimum. There is a great art in filling asparagus correctly, and due allowance should be made for any contraction which occurs during processing.

Processing

Processing should be done immediately the bottles or cans are sealed, as at the high temperature at which the bottles emerge from the exhaust box, over-cooking is liable to occur, and apart from a loss in colour, the final result will be a "mushed" product. If bottles are being processed, they should be packed in wire trays and stacked (in a staggered manner) in the autoclave. The usual time of processing is twenty-five to forty minutes at 240° F., depending upon the tenderness of the raw material. If bottles are used, it is essential to employ pressure cooling, otherwise serious loss will occur, due to the metal tops flying off. The finished product must then be cooled immediately to prevent further cooking. Bottles and cans should be stored in an inverted position—that is, with the "spearheads" pointing upwards.

Too much emphasis cannot be placed upon the delicacy of asparagus, and the process should be carefully controlled through the blanching, filling, exhausting and sterilising processes, in order to make sure that the product is not so tender that it will break up into a "mush" in transit.

Waste

The waste from canning asparagus is considerable. First, there are the trimmings or "soup-cuts", and, in addition, the discoloured or broken pieces. This waste consists of material which still has a considerable flavour of asparagus, and, if the trimmings have been properly cleaned, they should be free from soil and dirt. As asparagus is a vegetable almost in the luxury grade, it is a good plan to make use of this waste material for asparagus soup, and the following recipe will give an idea of a method of using it to produce a good quality cream of asparagus soup:

(*Continued on next page.*)

TINPLATE RESEARCHES

A resumé of three publications of the International Tin Research and Development Council which were issued during the past year and are of interest to the Canning Industry

The Corrosion of Tinplate

THE corrosion-resisting properties of tin are the reason for its use as a coating metal over steel in the form of tinplate. In several of its uses tinplate is exposed to corrosive conditions, and in some of them the tin itself is attacked. A review by Dr. T. P. Hoar of the mechanism of the corrosion of tinplate under conditions such as those obtaining in the cans used for packing foodstuffs has just been published by the International Tin Research and Development Council as Technical Publication, Series A, No. 30.

The corrosion of tin and of steel, separately and together, is considered. Tin itself may suffer two main types of attack, depending on whether the thin invisible film of stannic oxide is completely removed or only partially penetrated. It is completely removed by acid and by alkaline solutions, the metal then undergoing general attack which is rapid in the presence of air. The stannic oxide film is not removed by neutral solutions of the chloride or sulphate types and tin is not readily corroded by them. When corrosion does occur it may take the form of attack at isolated breakdown points in the film, leading to " pitting ".

It has so far been found impossible to manufacture tinplate entirely free from holes in the tin coating, and the corrosion of the exposed steel is a major factor in the service value of the tinplate. The attack on steel by acid liquids depends very much on the presence of traces of inhibitors such as proteins and tin ions and accelerators such as sulphide, and also whether or not air is present. In tinplate, tin and steel form an electrolytic couple which in recent years has been closely investigated, and it has been established that the tin or the steel can be cathode in the tin-steel couple under suitable conditions. If the tin dissolved forms stable complexes with the anions of the attacking medium, tin will normally become anodic to the steel. As regards corrosion, steel has peculiarities which have only been discovered recently, and these have also to be taken into account. Another factor is the layer of tin-iron compound always present between the steel and its tin coating, and is the subject of investigations which are still proceeding. Several factors which tend to reduce corrosion in sealed food cans and use of lacquers for some purposes are dealt with. Among the practical remedies for tinplate corrosion are coating with lacquer or with electro-deposited tin and improvement of the steel base.

Black Spots on Tin and Tinned Ware

Black spots are found to a greater or less extent on most tinned material exposed to neutral or nearly neutral aqueous solutions. They are, however, observed especially in the dairy industry in equipment in which milk, cream and other dairy products are treated or kept, such as storage vessels for milk and cream, cream-ripening vats and separators.

This type of corrosion has been investigated by Dr. S. Brennert of Stockholm, and his results are published by the International Tin Research and Development Council as Technical Publication, Series D, No. 2.

The black spots are due to an electro-chemical corrosion process. On a free tin surface the formation of black spots does not begin until a certain potential against the solution (the " dissolution potential ") is reached, the value of which varies with the composition of the solution.

The black spots can continue to grow, however, especially in very dilute solutions, at potentials less noble than the dissolution potential. The single potential of a freshly polished tin surface and that of a newly tinned surface generally represent values less noble than the dissolution potential; but through the further growth of the air-formed film on the surface of the tin in neutral or nearly neutral solutions—*e.g.*, sodium chloride solutions and milk—the potential may rise above the dissolution potential. At " weak points " of this film the tin can then corrode and black spots are produced.

The formation of black spots can be prevented by keeping the tin in contact with a less noble metal—*e.g.*, zinc or aluminium—thus ensuring that the potential is kept below the dissolution potential.

Finally, the formation of a protective film on tin by anodic oxidation or other methods deserves consideration.

Examination of the Surface of Tinplate

An optical method has been devised by W. E. Hoare and Bruce Chalmers for the examination of the surface of tinplate. The method is described in Technical Publication, No. 21, Series A, of the International Tin Research and Development Council, and involves the formation of interference fringes between an optical slab and the tin surface.

The method enables a distinction to be made between hollows and reliefs in the surface, and the depth of an irregularity is easily determined by counting the fringes under visual observation. Irregularities in tinplate examined by the method included pores, crystal boundaries, ripple marks, grease marks and grease lines. The method appears to be generally applicable to the study of surface contours of hot-dipped, electro-deposited and other coatings.

THE CANNING AND BOTTLING OF ASPARAGUS (Continued from opposite page)

Recipe for Canned Asparagus Soup

Asparagus pulp	16 gal.
Vegetable extract	4 lb.
Cornflour	4½ ,,
Dried milk	20 ,,
Water	30 gal.
Margarine (or purified animal fat)	4 lb.
Salt	4 ,,
White pepper	½ ,,
Nutmeg	½ oz.

The asparagus pulp is prepared by slowly cooking the thoroughly cleaned canning or bottling residues until tender, then brushing through a fine pulping machine. It is preferable to homogenise this pulp before incorporating it in the soup, but it is not absolutely necessary. The dried milk is dissolved in water, and the asparagus pulp, vegetable extract, salt, pepper, nutmeg and margarine (or purified animal fat) added. When boiling, it is thickened with cornflour previously mixed into a paste with a little water. The soup should be filled into cans and closed at 180° F. and processed for thirty to forty minutes at 240° F.

The PACKING of NATURAL CHEESE in CANS

A valved can showing the outside of the lid (in the centre) and the inside of the lid (on the right).
(Reproduced by courtesy of the Metal Box Co., Ltd.)

IT IS not often that the low consumption of a certain foodstuff results in scientific research into the packing of it in order to induce the consumer to use more. At any rate, that is what happened about eight years ago when the United States Government discovered that the American people only consumed about one-quarter as much cheese per head as is eaten by Europeans. Pursuing the line of thought typical of American people, they realised that American housewives prefer to purchase nearly all their food supplies in the wrapped and packed form, instead of from the bulk, and that the sale of Cheddar cheese, for example, was diminishing considerably. Research work was therefore commenced by the U.S. Department of Agriculture at the Dairy Institute Bureau, under the directorship of Dr. L. A. Rogers.*

It is well known that a loss in the weight of a cheese takes place by evaporation, and there is an actual loss of cheese in cutting up which is unavoidable. At the same time it was realised that no useful purpose would be served if in packaging cheese in its natural form a lowering of the standard of quality should be necessitated. Other forms of cheese which are melted and mixed with an emulsifier are wrapped in foil and packed with success, but a type of cheese is produced with characteristics of consistency and flavour inherently different from the natural cheese. The object of the investigation was to discover a method whereby the curd could be packed in the can straight from the cheese press, but the difficulty then encountered was the pressure developed in the can during the normal process of maturing and ripening.

* *Tin*, Feb., 1936, p. 5.

The Valved Can

This difficulty has now been overcome by the provision on the lid of the can of a simple relief valve. The valve is described as a modification of the well-known Bunsen valve and is said to be very dependable in action. It is a form of non-return valve, with a thin rubber diaphragm about 1 inch in diameter stretched over a dome in a circular recess in the lid. The diaphragm is actually fixed in a small tinplate cap which is pressed into the recess in the lid, thus stretching the diaphragm across a small hole ($\frac{1}{10}$-inch diameter) in the dome. A small hole in the cap, opposite that in the dome, releases any pressure in the cap that would be produced by the pressure of the dome on the rubber diaphragm. This can be seen quite clearly from the accompanying drawing. Thus, when there is a gas pressure in the can, the diaphragm is raised and the gas escapes beneath the diaphragm, passing around the edges of the cap, which does not fit airtightly into the domed recess. When there is no pressure inside the can the orifice in the dome is closed by the stretching of the rubber diaphragm over it. No air can enter the can.

The rubber of which the diaphragm is made is vitally important, as this must not perish during the time of maturing and keeping of the cheese in the can. As the cheese in the can is wrapped and the orifice in the lid is so small no flavour should be derived from the rubber. The rubber diaphragm is firmly held by being

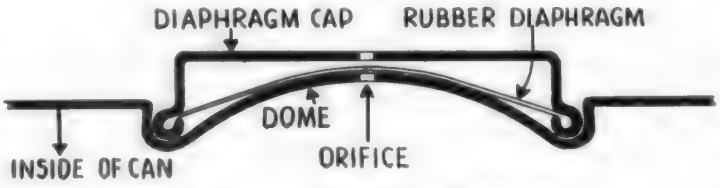


Diagram of valve showing rubber diaphragm.

folded in with the edges of the cap. As far as can be judged from an examination of the valve and its parts, there is little likelihood of foreign particles finding their way under the diaphragm and much less up to the orifice in the dome. The valved can is the subject of English Patent No. 414,282.

The body of the can used at present, which is of the open-top type because it must be hermetically sealed, is scored so that it may be opened with a key instead of a can opener, which may possibly damage the cheese. The can, the lid and the valve cap are lacquered. Cans of 12-oz., 1-lb. and 2-lb. capacity have been produced in this country, but shapes and capacities to suit the cheese makers for the home or export trade will yet have to be worked out.

A Method of Manufacture

Up to the point of putting the curd into the press, the manufacture of cheese for packing in cans does not vary from the standard procedure. Manufacturers can follow their own methods and produce cheese of their usual type and flavour and create for it a definite brand by which it can be easily recognised. A procedure for a Cheddar cheese is described as follows:

The hoops should not be dressed before they are filled, and they should be placed close together in the upper end of the vat and filled by scooping the curd on top of them. After the hoops have been well filled and covered with curd they should be allowed to stand in the vat from ten to fifteen minutes. This enables the curd to settle and avoids the necessity of packing each individual hoop. During this "settling" period the vat should be covered and heated to keep the curd warm. Shrinkage in the press usually ranges from about 5 to 7 per cent.

Pressing.—The curd may be compressed in the Daisy or Longhorn type of press. After the cheese has been pressed from half an hour to an hour it should be taken out of the hoops and wrapped tightly in a medium weight unbleached cotton cloth, the cloth having previously been soaked in warm water. Then the cheese should be wrapped in a piece of cloth of the same length as its girth, and cloth should also be placed at each end, when the cheese should be put back into the hoop and pressed for not less than six hours. It may then be taken out of the hoop and the wrappers removed preparatory to cutting. Immediately the cheese has been cut into prints (which must be five-eighths of an inch shorter than the inside depth of the can and three-sixteenths of an inch less in diameter) it should be wrapped in parchment paper or a suitable transparent wrapping membrane and put into the can. The can should then be closed at once with the valved lid by a double seaming operation.

Curing.—The sealed cans are packed into cartons, taking great care that the valve end is uppermost, as this is very important. The cartons containing the sealed cans are then placed in the storage room, when no further handling is necessary. It is obvious that there is now very little oxygen present in the can, and it is fundamentally necessary that the oxygen should be eliminated as soon as possible. During the ripening process the cheese evolves carbon dioxide, and this creates a pressure within the can. The pressure activates the valve and the oxygen is driven out, so that the requisite conditions for maturing and ripening soon obtain within the can.

The temperature of the storage room may be maintained between 40° and 65° F., depending on how rapidly it is desired to cure the cheese. If the temperature is allowed to exceed 70° F. the flavour may be impaired and the surface of the cheese will become oily. It has been found that canned Cheddar cheese can be held at 65° F. without the difficulties usually encountered in curing cheese in the ordinary way at such a temperature.

It is recommended that a can of cheese representing each vat be examined after about two months, when it is possible to determine with some degree of accuracy the ultimate quality of the cheese when completely cured. If by any chance it is not turning out satisfactorily it may then be stored at a lower temperature—say, 34° F.—and sold as mild cheese. The cartons must be date-marked in order to indicate when the cheese will be ready for distribution.

The Advantages of Canned Cheese

For the Manufacturer.—By packing the whole natural cheese in cans it is possible to brand it distinctively and thus establish a mark by which the cheese can be recognised. There is no loss in weight due to shrinkage in curing and it is possible to control the quality and flavour, thus maintaining a high standard of uniformity. It eliminates labour during the curing process, which represents a saving in cost. The export trade in natural English cheeses may be stimulated and increased.

For the Distributor.—Cans of cheese are easily stocked. The cheese should remain in good condition indefinitely without losing its attractive appearance. It can be handled with ease and there is no waste in cutting.

For the Consumer.—The consumer can purchase a fixed quantity of cheese (retailers being frequently inaccurate in gauging a "cut" of cheese). The cheese can be kept in reserve without the possibility of imparting flavour to other food. A uniform quality and flavour is obtainable. There is no waste due to the formation of rind.

Summary

The packing of natural cheese in cans has been made possible by the development of a special valved can.

The valve, which is of the relief type with a rubber diaphragm, is designed to permit the gas evolved by the cheese during maturing to escape, whilst there is no access to the can when there is no pressure inside. The quality of the rubber diaphragm is vital to the efficient life of the valve.

A suitable atmosphere is said to be quickly attained inside the can, allowing the cheese to mature to the desired flavour and quality according to the temperature and time of curing in storage.

Provided proper control is exerted during curing, cheese can be distributed in a uniformly mature condition.

No rind is formed, there is no loss of moisture in stock in the shop or the house, and definite quantities can be purchased.

Cans can be labelled with the manufacturers' distinctive marks, whereas natural cheese as normally sold does not carry such a mark.

The valve and a typical method of manufacture for a Cheddar cheese have been described.

G. W. L.

THE COMMON HERRING

(Clupea harengus, Linn.)

The following is the second part of the article commenced last month by ELLIOT B. DEWBERRY, M.R.I.P.H., M.R.San.I., dealing with the food value, life history and commercial preservation of the common herring. The third and concluding part will be given next month.

Breeding and Development

Spawning.—In the spring herrings spawn near the Scottish coast—Firth of Forth, off Cape Wrath, the Hebrides, and also along the West Coast of Norway and in the Skager-Rack. From August to October spawning occurs off the North and East Coast of Scotland and on the English coast from Northumberland down to the Wash. In winter the spawning grounds are situated in the vicinity of the Sandettie lightship and the Gabbards. In January and February spawning takes place off Cap d'Antifer, in the eastern part of the English Channel and along the Devon and Cornish coasts.

Under the Herring Industry Act of 1935 the Herring Board has closed the Dowsing spawning area from August 12 to September 30. This area lies about twenty miles from the coast of Lincolnshire between Grimsby and Skegness. It includes the shallow waters on the outer Dowsing, East Dudgeon, and Cromer Knoll.

The selection of a spawning ground is governed by the temperature and the nature of the sea bed, the depth varying from between twenty to forty fathoms. The most favoured grounds are those having a fairly hard clean surface, such as gravel or sand mixed with shells. A muddy or shifting sea floor is always avoided. Favourite sites are coastal banks and slopes in comparatively shallow water, but the depth varies in different situations.

The minute globular opaque eggs (hard roe), each from 0·92 to 1·5 mm. in diameter, are deposited at intervals by the female, in clusters or masses numbering from 21,000 to 48,000. They become attached to the sea bed or to seaweed by the hardening of their mucilaginous surface coatings and are fertilised by the milt (soft roe) extruded by the male herring. The quantity of milt is so large that it forms a dense greenish white cloud in the sea, sometimes a mile long. Fertilisation is accomplished by the milt entering an opening in the egg capsule termed the "micropyle". The development of the egg is usually rapid, but this depends upon temperature and salinity of the water. By the second day the embryo nearly reaches three-quarters of the way round the yolk, from which it derives its nourishment. About the fourth day the larva shows signs of life and can be seen wriggling inside the egg membrane until it finally breaks through and passes into the water.

A number of experiments carried out to determine the relationship between temperature and duration of the incubation period show the following results:

Temperature.	*Incubation Period.*
14-19° C.	6 to 8 days.
10-12° C.	11 days.
5-6° C.	18 to 21 days.

The newly hatched larva is slender, transparent, and about ¼ inch long. The eyes are black, jaws undeveloped, gill silts open, but there are no gill covers. The unabsorbed yolk-sac is carried beneath the abdomen and the gut extends nearly the whole length of the body. During this early period the larva is incapable of individual movement, and is consequently an easy prey to a host of enemies. Large numbers also die through lack of suitable food.

After absorption of the yolk the jaws develop and the larva seeks food. When about ⅝ inch in length fine rays appear in the tail and middle of back, and the dorsal, ventral and pelvic fins develop. The important physical changes, however, take place at the ages of 2½ to 3½ months (1⅝ to 2 inches in length). There is growth and thickness of the body, the scales develop as tiny pockets along the middle line, and a silvery sheen appears on the skin. The swim-bladder can be seen, the gut shortens, and the young herring takes on the appearance of the adult. This is known as the "whitebait" stage. The rate of growth is extremely variable and determined by the temperature of the water, the nature of the food, and the season in which the brood is hatched.

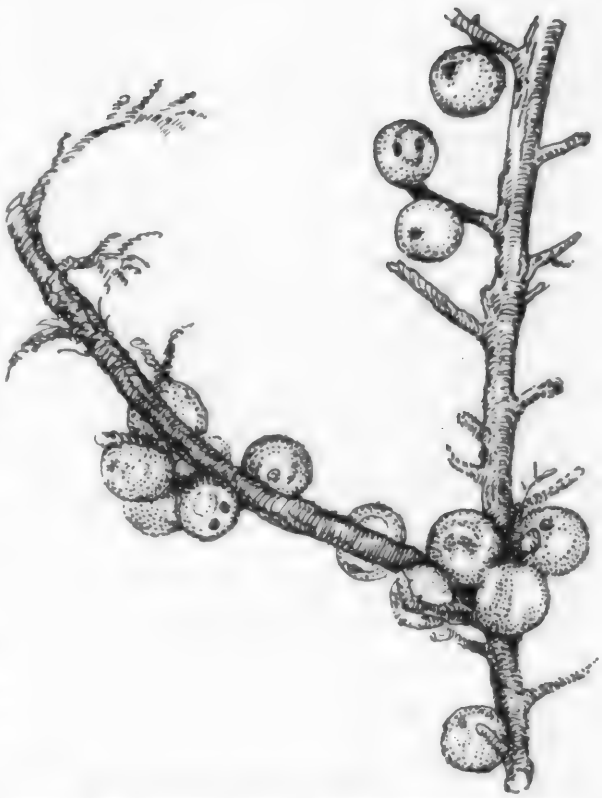
Investigations have been carried out by the Ministry of Fisheries regarding the movements of herring larvæ. By studying the speeds and directions of the sea currents and force of prevailing winds, using drift bottles and indicators, it has been found possible to approximately calculate the direction taken by a brood of herring on leaving the spawning grounds. The young herring now frequent shallow coastal waters and estuaries such as the Wash, Morecambe Bay, and the Thames, where they remain until they are about twelve to eighteen months old (3½ to 6 inches long). They then migrate to deeper waters, and at two years old (6 to 7 inches) are found in the shallower parts of the North Sea, in the vicinity of

banks such as the Dogger Bank. Here they feed and grow rapidly and build up the supplies of fat necessary for the ripening of the reproductive organs. In the spring and early summer of their third year, all have left the estuaries and bays and become incorporated into the shoals of older herring (four to nine years) which have migrated from the deep sea to the shallow coastal waters to spawn. Maturity, which is accompanied by a decrease in rate of growth, differs in the various seas. North Sea herrings mature in the third or fourth year, and are then approximately 9 to 10½ inches in length, but in Norway maturity is not reached until the fifth to the eighth year. It is quite impossible to tell the age of herring by their size alone. A fish 11 inches long would be large for the southern North Sea, but a length of 13 inches is common in Norwegian waters, whilst mature herrings 4 inches long are found in the Baltic Sea.

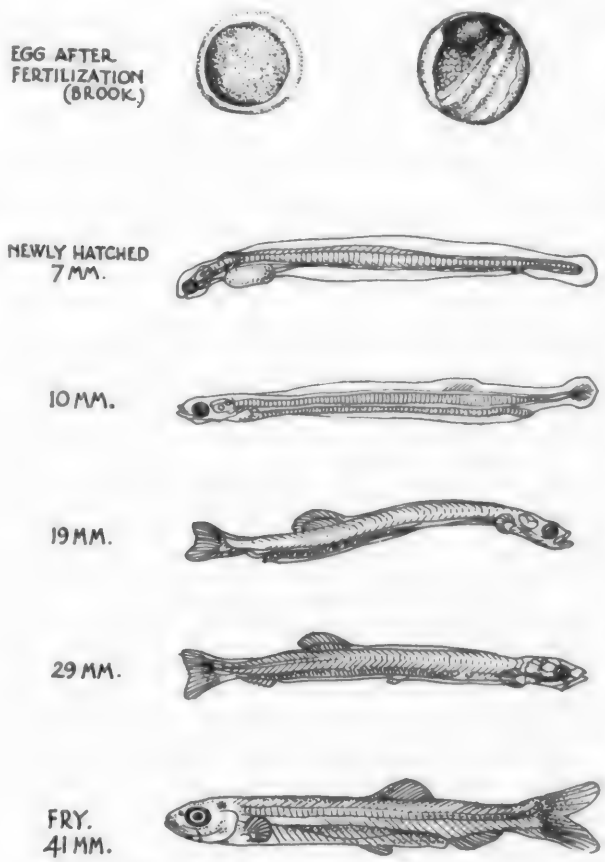
H. Wood gives the growth of the herring of Scottish north-east coast as follows:

	Years.					
	1	2	3	4	5	6
Mean size (inches) ...	4¾	7¼	9⅛	10¼	10⅞	11

There are two main groups of herring in British waters, one group spawning in the autumn and the other in winter and spring. The autumn spawners live in the open sea in water of medium or high salinity, but the spring spawners prefer water of medium or low salinity. After spawning the "spent" fish, which are in a weak condition, quickly leave the spawning grounds and drift passively with the currents. Those which spawn near the north-east coast of France (Cap d'Antifer)—*i.e.*, the Lowestoft and Yarmouth herring—are eventually carried back to the North Sea, following a route near the Belgian coast. Recovering "spents" are caught off Lowestoft in March and April. The spent herrings of the Scottish coast tend to move eastwards. They do not frequent coastal areas in large numbers until a subsequent spawning season, their main habitat being now in deeper parts of the North Sea.



Eggs of the Common Herring (*Clupea harengus*) attached to seaweed. (After Ehrenbaum.)



Larval stages of the Common Herring (*Clupea harengus*). (After Ehrenbaum.)

Herring Races

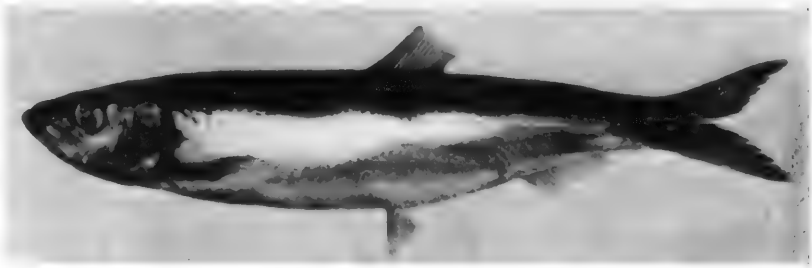
Autumn Herring.—The herring of the southern North Sea inhabiting the waters south of the Dogger Bank.

The Scottish herring. These are caught off the Shetlands and later off the main Scottish and English coasts down to the Dogger Bank.

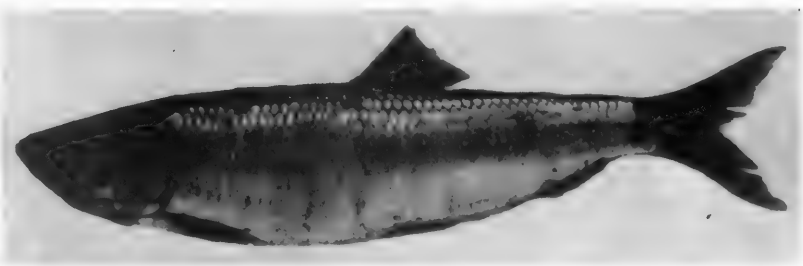
The herring of the Norwegian Skager-Rack coast and Jutland Bank, an eastern variety of the northern North Sea herring.

The herring of Cattegat and Baltic, and the herring of Iceland.

Spring Herring.—The herring of the southern North Sea. These are caught in the estuaries of the Elbe, Weser and Ems, and in the Zeider Zee.



A typical Scottish Summer Herring (female) 26·5 cm. in length. (With acknowledgments to the Fishery Board of Scotland.)



The Pacific Herring (*Clupea Pallasii*).

The herring of the northern North Sea and Skager-Rack. These include fish from the Clyde, Firth of Forth, and also the noted herring from Loch Fynn.

The herring of the Limfiord, the Belt, and the western Baltic.

The herring of the eastern Baltic (Stromling).

In addition to the above, there are the herring of the White Sea, the Irish Sea, and that of the Hebrides, and also the American and Pacific herring.

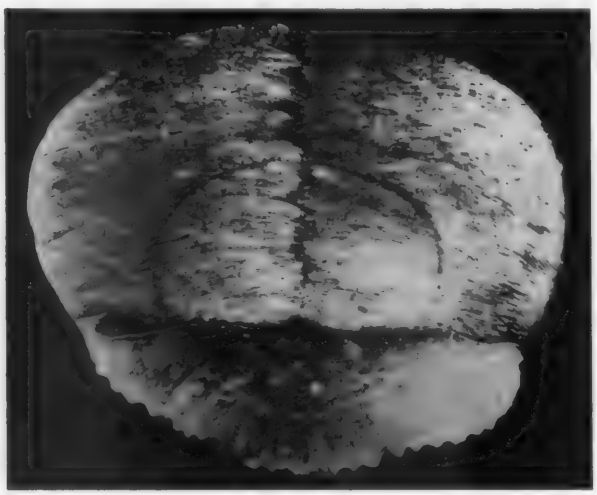
Structural Characteristics.—Investigations were carried out by the German scientist Dr. Heincke, and later by many other observers, regarding the differences in the structural characteristics of the various races of herring. These differences include numerical variations in the vertebræ, fin rays and scales along the keel of the fish. For instance, the mean number of vertebræ in the Norwegian spring herring is 57·6, and in White Sea herring 53·6, a difference of 4·0 vertebræ. The mean of all herring races is 56.

The following table shows the main difference between the spring and autumn herring:

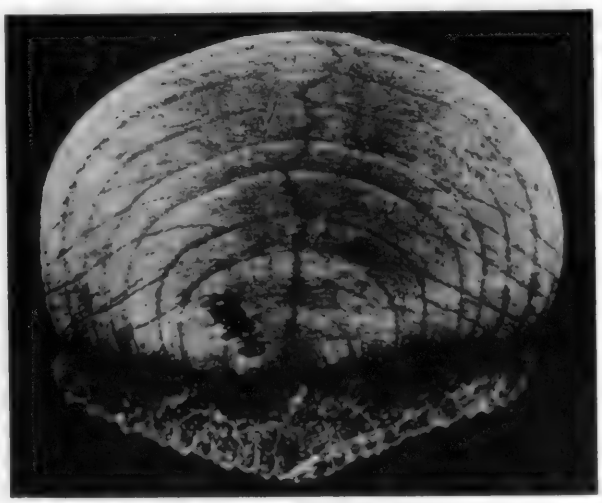
	No. of Vertebræ.	*Belly Scales.*	*Ventral Fin.*	*Lateral Length and Height of Head.*	*Spawning Period.*
Spring	51·57	36·46	Nearer head	Less	April and May Brackish water
Autumn	55·58	33·48	Nearer tail	Greater	August to Feb. Salt water

Ascertaining the Age of Herring.—During the period 1895-1899 experiments were made to determine the age of fish by certain markings on their scales and ear-stones (the latter are small discs situated on either side of the brain and termed "otoliths"). F. A. Smith was the first to associate rings on the scales of fish as an index of their age, and the Norwegian experts Hjort and Dahl carried out the fundamental investigations in connection with the herring. Later Einar Lea of Bergen made a thorough study of the subject and demonstrated a definite connection between the growth of the scale and that of the fish from year to year.

The scale of a herring is divided by a transverse line into two parts, one is transparent and the other shows a



Scale of Herring showing one ring. (After Lea.)



Scale of Herring showing age rings and zones. (After Lea.)

number of zones or rings which run parallel with the edge of the scale. These indicate the age of the fish in much the same way as the annual rings seen in the trunk indicate the age of a tree. In the herring a transparent zone and a dark ring constitute a year's growth. Lea suggested that the distance between any two scale rings might be proportional to the amount of growth made by the herring in the same period. The Norwegian investigators claim to have proved that the broad transparent zones are formed in from May to October, while the narrow dark bands are formed in from November to April, and known as "Summer Rings" and "Winter Rings" respectively.

The scales and zones are not always clearly marked, especially in older fish, and there are also individual "faults" which sometimes make calculation of age difficult. Again, spring or autumn spawned fish must be differentiated. Autumn-hatched herring may be fifteen to eighteen months old before the first winter ring appears, but spring fish acquire the first ring in from nine to thirteen months, a difference of six months in fish exhibiting the same number of rings. Prolonged research, however, has shown that the scales of the herring are very reliable and give accurate details of their age.

The earstones are sometimes used for ascertaining the age of herring. These are six in number, but only the two largest show clear markings and are represented by alternate white and blue zones. The broad white zone indicates summer growth and the narrow blue one winter growth. This method is used by German fish experts when dealing with herring catches from trawlers.

(*To be continued.*)

AN EARTHY ODOUR IN FISH DUE TO ACTINOMYCES

A Note by Dr. Hugh Nicol

A SIDELIGHT on the subject of the production of odoriferous substances by micro-organisms, which was discussed in an article by the writer in *The Manufacturing Chemist* for February, 1936, is the discovery that an earthy taint in fish is ascribable to a species of actinomyces. Two papers by A. C. Thaysen and F. K. T. Pentelow in a recent issue of the *Annals of Applied Biology* (vol. 23, 1936, 99-104, 105-109) are devoted to descriptions of investigations of this micro-organism and of its effect upon fish. Though the substance causing the taint has an unpleasant smell, said to resemble the odour of manure, it is probably not very dissimilar from the more agreeable substances which such micro-organisms are capable of producing.

The tainting substance could be isolated from a species of actinomycete, itself isolated from an important salmon river (name not disclosed) by extraction with ether of a distillate of the organism in pure culture. The compound was volatile in steam, slightly soluble in water, partly soluble in alcohol. So powerfully did it affect the senses that it imparted to water a distinct earthy taint when diluted one part in five million. More pleasant substances of microbial origin may be expected to be equally as potent.

The fish apparently absorbed the substance through the gills, similar results being obtained in nature with salmon, and in a pond supplied with the isolate and stocked with trout. It is stated that the taint could be detected not only in the cooked fish but also in the uncooked flesh and in the water in which fish had been cooked. Live fish were strongly tainted after being placed for one hour in a solution of two parts per million of the substance, but dead fish were unaffected so long as their bloodvessels remained intact.

An interesting outcome of the work with tainting fish and with the cleansing of tainted fish was a confirmation of the stock recommendation of the cookery books to keep fresh-water fish, taken from muddy rivers or ponds, in running water for a few days to remove the muddy taste. It was found that fish which had been exposed to very low concentrations of tainting substance for as little as an hour retained a perceptible earthy flavour after two to three days in running water, but lost it within five days.

FOOD BUREAU FOR HOUSEWIVES

THE Continental Can Company (U.S.A.) is establishing an experimental food bureau, which will be called "The Continental Kitchen", for American housewives. It is understood that the bureau's job will be to provide housewives with data on nutrition and other dietary problems, to conduct independent research into the food field, and to develop and test new home recipes.

Mr. O. C. Huffmann, president of the Continental Can Company, according to a recent issue of *The Canner*, said: "We will seek the co-operation of leading chemists, dieticians and doctors from time to time, and will publish pamphlets in which the subjects of calories, vitamins and general health values of foods are discussed. Another important feature of 'The Continental Kitchen' will be the furnishing of menus, meal suggestions and recipes that have been fully tested out from the standpoint of health, as well as of taste. In addition, the services of the bureau will be available to editors, food companies and the general public for special help in food research."

"The Continental Kitchen" is being established, Mr. Huffmann said, as a supplement to the research work already being sponsored by the company in the field of canning and food preservation, which has resulted in the introduction of "flaked coffee" and other new products. According to present plans, much of the bureau's experimentation will be carried on through the use of a "test kitchen" operated by Continental's advertising agency.

"In setting up 'The Continental Kitchen' our company will, I believe, be making a real contribution in the way of home service", Mr. Huffmann declared. "Through the assistance thus offered to food experts of newspapers and magazines, the public will have access to an extensive fund of information on all phases of the diet problem."

CANNING ITEMS

CANNED FRIED FISH

A BOOKLET, written and sent by Dr. D. J. Tilgner of Poland, describes the principles of the production of fried fish for canning.

The fried fish are divided into two types according to amount and thickness of flour applied on their surface for frying purposes. Both types are produced and canned in Poland. The various production steps include cleaning, salting, covering the fish with flour, frying same in an oil bath at a temperature of 180° to 200° C. and canning. A vinegar brine or a spiced tomato sauce are used for covering the fried fish in the can. The latter type of canned fish is widely known in Poland as "skumbrje" and "byczki", which are made chiefly of perches and roaches.

Fried fish canned in tomato sauce should possess a firm consistency, and furthermore it should be neither cracked nor crumbled. Its texture should be delicate but by no means dry or overcooked. Its surface should be smooth, exempt of any light-coloured particles which occur as a rule when too large amounts of flour are applied. The tomato sauce should be of a red colour with a brownish hue. No foreign substances like scales, parts of the head, fins, etc., are allowable in the can.

The flour used for frying the fish should possess certain quality requirements, and the flour must be therefore duly examined previous to powdering the surface of the fish and entering the frying bath. Its properties are critically discussed in this paper as well as the physical and chemical properties of the oil, which is of essential importance. Furthermore, instructions for preparing various kinds of sauce are included in the text, the main components of the sauce being tomato purée, vinegar and various spices. It also follows from the respective researches that the oil bath for frying the fish has to kept at a constant temperature, whereby different heating systems as well as steam pipes may be advantageously applied if certain requirements are observed.

This paper covers further ways of preparing fried herrings, the sterilisation of the canned product, methods of testing cans used for canning purposes, the storage of the finished product, and discusses labelling and packaging problems.

Some of the general data pertaining to the cost of frying are as follows: Loss of weight during the frying process amounts in the average to 10 to 20 per cent. of the weight of the cleaned fish. It depends from the temperature of the oil bath, the quality of the oil, the length of time used for the frying process and, finally, the amount of fish used for frying; 10 to 90 gm. of flour and approximately 10 per cent. of frying oil are applied for 1 kg. of cleaned fish, whereas the amount of raw fish, oil and tomato sauce per 100 cans of finished product depends from the proportion of the fish and the amount of tomato sauce used for filling one can of 11 oz. net weight.

The booklet is issued by the Food Products Laboratory of the Standardisation Bureau of the Association of Polish Chambers of Industry and Commerce in Warszawa, in compliance with the general standardisation programme and requirements set by the Ministry of Industry and Commerce.

INCREASE OF CANNED FRUIT IMPORTS

THE statistical report of the Imperial Economic Committee shows that the imports of canned fruits into this country in 1935 constitute a record, exceeding the previous record, established in 1934, by 7 per cent.

The United States is the chief source of imports into the United Kingdom of canned and bottled fruits, preserved in syrup, with the exception of pines.

In comparison with the U.S.A., imports of other countries are small, but it is interesting to note that, collectively, Empire countries supplied 38·6 per cent. of the total of 3,691,000 cwt. imported in 1935. This stands against 43·8 per cent. of the total of 3,450,000 cwt. in 1934.

The statistics supplied with reference to Empire countries are extremely interesting. Although Australia in 1935 sent 38,000 cwt. less than the 501,000 cwt. consigned in 1934, her 1935 exports to the United Kingdom compare very favourably with those of 1929, which were only 136,000 cwt.

Canada's contribution, 117,000 cwt., is an increase of 3,000 cwt. on 1934 and 83,000 cwt. on 1929.

South Africa has, between the years 1929 and 1935, doubled her consignment; in 1929 it was 21,000 cwt. and in 1935 44,000 cwt.

Malaya supplied 801,000 cwt. which was a decline of 48,000 cwt. as compared with 1934.

Malaya's exports to the United Kingdom show the amazing figure of 800,304 cwt. of pineapples, which is a very large percentage of her total. Australia, Canada, South Africa, the Fiji Islands and Mauritius all supplied pineapples in varying quantities, but the nearest approach to the supply of Malaya was that of the United States, which amounted to 42,840 cwt.

With apricots the U.S.A. had a clear lead, sending us 167,882 cwt. Her nearest rival was Australia, whose amount totalled 61,169 cwt.

Empire exports to the United Kingdom included apricots, peaches, pears, pineapples, fruit salad, currants and berries.

The exact figures for total Empire imports of canned and bottled fruit into this country in 1935 were 1,425,000 cwt. The total foreign imports were 2,264,968 cwt.

The total value of Empire and Foreign exports to the United Kingdom was £6,056,539.

CHEESE, BUTTER AND CONDENSED AND DRIED MILK

THE Minister of Agriculture was recently asked in Parliament whether he could state the cheese capacity in this country in 1933 and the capacity at the present time, and if he could give similar figures for butter and condensed and dried milk.

In reply, Mr. Elliot said: I regret that I have no information as to the total capacity of the factories which manufacture milk products. The following figures, which have been supplied to me by the Milk Marketing Board, show for the years 1933-34 and 1934-35 the intake of milk for manufacture into cheese, butter, condensed milk and milk powder at factories in England and Wales which have been approved by the Board for the supply of milk at manufacturing rates:

	1933-34. (*Gallons.*)	1934-35 (*Gallons.*)
Cheese	61,635,700	91,887,000
Butter	41,291,550	83,706,250
Condensed milk ..	39,929,850	57,227,100
Milk powder ..	8,357,750	12,680,250

It is stated by the Milk Marketing Board that these increases are mainly due to increased sales of milk through the pool by farmers who had previously used it on their farms in the manufacture of cheese and butter and in the rearing of calves.

CANNED COW BEEF

"I MAINTAIN that all home-killed cow beef should be canned. Let Argentina keep her own, and then we shall be able to can ours," declared the chairman at the annual meeting of the Northallerton Live Stock Mart Co., Ltd.

Several speakers contended that the presence of large quantities of cow beef on the wholesale markets was injurious to the demand for better-grade meat and adversely affected values all round. Home beef-producers would be in a far happier position if cow beef was prohibited from sale on the ordinary meat markets.

CAN-CANS' SPRING GOLF MEETING

THE Spring Golf Meeting of the Can-Can Club has been arranged for Thursday, April 30, at the Chislehurst Golf Club, Camden Park, Chislehurst, Kent. All members, players and non-players, are invited to attend.

Handicap Singles will be played in the morning and Four-Ball Foursomes against bogey in the afternoon.

Particulars can be obtained from Mr. A. A. Maytham, Dewey and Almy, Ltd., Shell Mex House, Strand, W.C. 2, or Mr. Keith Fraser, c/o *Food Industries Weekly*, 17, Stratford Place, W. 1.

SEALING OF STEEL PAILS

A CAREFUL explanation of methods and requirements for properly sealing steel pails has been prepared by Dewey and Almy Chemical Company, U.S.A.

Following an exposition of the troubles experienced before the development of "Flowed-In" gaskets, the descriptive matter explains what the latter are and how they are made. The numerous advantages and desirable qualities of the gaskets are cited.

TESTING FOR THE PRESENCE OF FORMALDEHYDE IN SALT-CURED LING

REAY (*Analyst*, 1936, **61**, 78-85) has shown that ling (fresh or salted) to which no formaldehyde has been added as preservative may give a positive reaction in Schryver's test applied directly to the flesh, and positive reactions with all the formaldehyde tests as customarily applied to distillates of the flesh. The usual methods of testing, interpreted qualitatively, are therefore quite unsuitable for proving that formaldehyde has been applied to salt ling as a preservative. Evidence was presented to show that quantitative data obtained by applying Schryver's method to non-formalinised salt ling are not fully explained, and therefore the method cannot be used for quantitative detection of added formaldehyde. It was shown that the phloroglucinol reagent may be employed qualitatively to detect free formaldehyde in fish. The possible relationship of amine bodies to the positive reactions given by non-formalinised fish was also discussed.

There was no evidence to show that formaldehyde is a normal constituent of fresh or salt-cured ling.

THE RISK OF ERROR IN DETERMINING TRACES OF ARSENIC

WHEN arsenic is present in materials in the form of arsenate, or when these materials have undergone an oxidation treatment which converts the arsenic from the arsenious into the arsenic form, before the ordinary Marsh and Gutzeit test is made, Davis and Maltby (*Analyst*, 1936, **61**, 96-100) point out that great risk occurs of underestimating the arsenic present. This is due to the relatively difficult reduction of arsenic acid to the arsenious form. Many samples of commercial zinc, when dissolving in hydrochloric acid, even when "stannated" or in presence of a "few drops" of stannous chloride solution, fail to reduce arsenic acid completely to arsenious acid. This is true even when the action is carried out at 40° to 60° C.

To ensure complete reduction it is usually necessary to carry out a pretreatment with sulphurous acid, as described by the authors. Prior reduction with stannous chloride and potassium iodide, as in the A.O.A.C. method (1930) is also effective. As many samples of AsT zinc evolve hydrogen slowly at the ordinary temperature, it is nearly always necessary to heat the reaction flask to 40° to 60° C. during the Gutzeit test, to ensure complete estimation of arsenic.

INDUSTRIAL NEWS

Very Low Temperatures

An exhibition of the attainment and uses of very low temperatures is being held at the Science Museum, South Kensington. The exhibits show how the gases in the atmosphere are obtained in gas, liquid, and solid form both on the laboratory and industrial scale. An exhibition of this nature has never before been held in this country nor, as far as is known, in any other country. Admittance is free, the exhibition closing on May 31 next.

Central Agricultural and Scientific Bibliography

A scheme came into operation on March 1, 1936, operated by permission of the Board of Education from the Science Library, S. Kensington, and is intended to supply all those who are interested in original work or research in agriculture and allied industries with information concerning the work previously published on any special subject. The subscription is ten shillings per annum for individuals or five guineas per annum (minimum) for institutions, firms, etc.

Mr. A. Stanley Garton

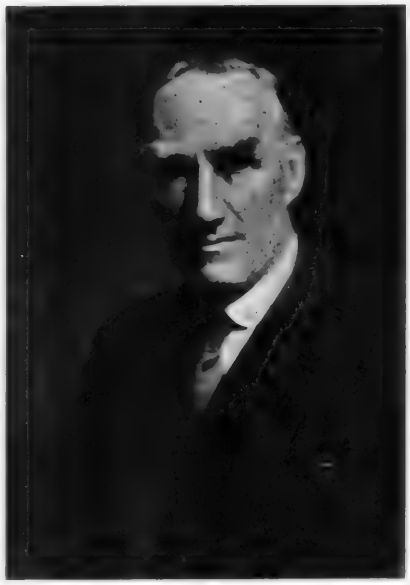
We regret to announce that Mr. A. Stanley Garton has decided to retire from the board of Garton, Sons and Co., of which he has been managing director for the last ten years. This decision was taken for purely private reasons and took effect as from March 31 last. The business at Battersea will be continued by the same staff and conducted in the same manner as before.

New Pea Canning Factory

Batchelor and Co. (Sheffield), Ltd., have recently purchased a 12-acre site at Wadsley Bridge, near Sheffield, on the main L.N.E.R. line for the erection of a pea canning factory at a cost of £100,000. The new cannery will be ten times the size of their present cannery, which is one of the largest in the country, and is to be designed by Mr. S. N. Cooke, F.R.I.B.A.

Peek, Frean Factory Extension

Peek, Frean and Co., Ltd., the biscuit manufacturers, are embarking on an £80,000 extension scheme which will add two acres of floor space to its factory in Bermondsey, London. The new building, which will house 1,500 operatives, is part of a scheme for reducing working costs.



Sir John Boyd Orr, the authority on Nutrition, whose book, "Food, Health and Income: a Report on A Survey of Adequacy of Diet in Relation to Income", is reviewed on page 140. This report is the first attempt to form a picture of the food position of the country, showing the relationship of income, food and health.

Czechoslovakian Need of Gelatine and Glue

Czechoslovakia possesses three gelatine and glue factories, which only cover part of the home needs. They are all situated in Bohemia (at Klatovy, Tábor, and Vysocany near Prague). The first and most important one is now entering into negotiations with a Chinese firm in Shanghai, which will send observers to acquire a knowledge of the technique with the object of manufacturing these products in China and sending them to Europe.

James Wright, India

We understand that Mr. James Wright is definitely retiring from the business in India, where he has only spent his time during the cool periods of the last 4 or 5 years. Mr. C. Fawthrop, who went out to India 33 years ago, is now in control as partner, but he too is contemplating retiring in a short while. Mr. Wright (junr.) and Mr. Fawthrop (junr.) will carry on the business. Mr. Wright, who lost a leg within a fortnight of landing in France during the war, is at present in control of the Bombay office. This concern is one of the largest importers of food and provisions in India.

New Alloy for Food Trades

A new alloy has been produced by Mr. N. Jones, of Frances and Jones, Ltd., of Bolton, to be used mainly for making machinery applied in the manufacture of foods, sauces, etc. The alloy is less expensive to produce than chromium plating and stainless steel and will not oxidise or tarnish. It is said to possess all the advantages of chromium plating with none of its disadvantages.

Meat Paste in Tubes

A London manufacturer is to use a collapsible tube for meat and fish pastes, the tube being accurately marked so that the equivalent of a teaspoonful can be extracted, a key being used to roll up the tube to the desired mark.

Similar containers are under consideration for cheese, butter, cream, condensed milk, jams, and jellies.

Keeping Pineapples Fresh

Experiments by food experts in Germany have resulted in a new method of keeping pineapples fresh, which might be applied to other fruits perhaps.

Liquid plaster is poured over the pineapple and allowed to remain until the fruit is required, thus making it airtight. A sharp pointed pick is used to break the plaster at one point, after which the rest is easily removed by hand.

Displaymax Co.

This firm has set a scheme on foot for displaying the manufacturers' goods to the best advantage. The scheme not only includes arrangement of window displays, but also sales talk, mention of new lines, etc., during the hours of the display being installed.

New Solvent for Analytical Work

Cyclopentadecanone, a new solvent melting at 65·5° C. reported by F. Geral (*Anal. Soc. Espan. Fis Quim.*, 1935, No. 323, 438), offers advantages in the microdetermination of molecular weights by the cryoscopic method. Owing to its wide solvent powers, it has found application in the determination of molecular weights of such complex organic substances as vitamin D. (*Chemical Industries*, U.S.A.)

Stacking or Tiering Machine

An interesting variant of the familiar stacking or tiering machine has been made by Herbert Morris, Ltd. It was designed to handle liquid chocolate, moving it from one process to another and pouring it into a high container. The stainless steel ladle is filled when practically at floor level and the castor-equipped machine is then pushed to the next operation point. By pressing a button the ladle rises to a height of about 6 feet. By pulling on the chain, the ladle not only tilts but also moves forward so that the tip of the ladle is always at the same place.

Grading Australian Eggs

The Australian Commonwealth Department of Commerce has circularised egg packing and exporting firms in the various States calling attention to the need for more care to be given to the quality of eggs submitted for export, particularly to the United Kingdom, during the present season.

Only sound fresh eggs which comply fully with the standard prescribed in the regulations will be permitted to be shipped overseas.

The Department has announced its intention to take proceedings against exporters in all instances in future where breaches of the regulations and grading instructions occur.

Canned Goods Merchants Extension

Richard B. Green and Co., Ltd., canned goods merchants, have opened a new building with a total floor space of 14,000 sq. ft. in Stanley Street, Liverpool.

The imposing saleroom provides ample space for display of the company's goods, and is flanked by offices for the saleroom and advertising staffs.

The testing of canned goods is done on the third floor, at which level, of course, the natural lighting, admitted by windows opening virtually the whole of the front wall, is excellent. A table some 23 ft. long, topped with zinc, is provided for the experts who test the goods for colour, taste, texture, quality of oil, etc. In the course of a single year some 16,000 tins of salmon alone are sampled.

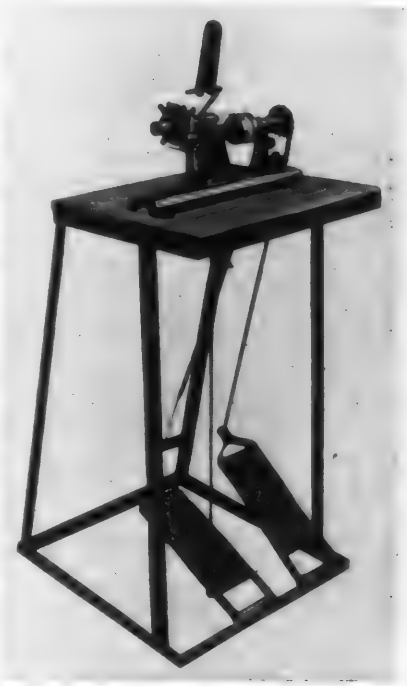
Morgan Harris and Co., Ltd.

An offer for sale was made recently of 75,000 Six and a Half per Cent. £1 Cumulative Preference shares in Morgan Harris and Co. at 21s. a share. The company has been formed to acquire two old-established businesses in South Wales of bakers and confectioners and of grocers, bakers, and provision merchants, and in consequence of the fusion economies may be effected and development continued under unified control without overlapping of production or service. The prospectus showed profits for seven years past, and the average profits of this period are sufficient to cover the dividend on the Preference shares more than twice. Behind the £75,000 of Preference capital there ranks £107,000 of issued Ordinary capital. The offer was made under the auspices of the Cheviot Trust. Expenses incidental to the offer, estimated at £8,500, are payable by the Trust, the preliminary expenses of the company payable by it being estimated at £1,650. Of the total purchase price of £170,500, goodwill accounts for £62,506.

The Confectionery Exhibition

A Chocolate and Confectionery Exhibition will be held this year at Olympia from September 2 to 10.

The Stacking or Tiering Machine made by Herbert Morris, Ltd., to handle liquid chocolate, moving it from one process to another and pouring it into a high container.



The Dalmath Taper for sealing containers with self-adhesive tape.

The Dalmath Taper

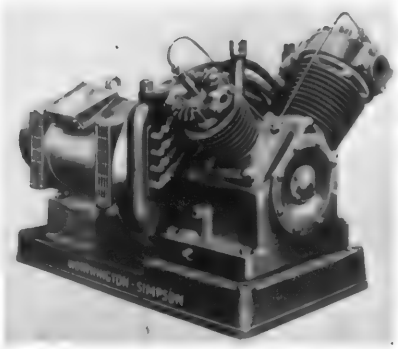
The Dalmath Taper is a new machine introduced by A. de St. Dalmas and Co., Ltd., of Leicester, to supply a long-felt want in the application of self-adhesive tape. It is stated to be ideal for the manufacturer whose output is not sufficient for an entirely automatic machine.

The machine is easily adjustable for sealing containers of practically any shape or size, and gives a quicker and better seal than is obtainable by any hand process. It will apply closure to any container holding from ½ oz. to 7 lb. The makers state that an inexperienced operator can seal, after half an hour's tuition, from 12 to 15 containers per minute.

New "Can-Can" Branch

The inaugural meeting of the new Worcester branch of the "Can-Can" Club took place at the Great Western Hotel, Worcester, on Thursday, March 26.

Mr. J. H. Brookman, of Thomasson and Co., Ltd., is the Hon. Secretary.



Worthington-Simpson Angle Type Air-cooled Two-stage Air Compressors, Two-Cylinder Type.

Two-Stage Air Compressors

It has long been recognised that two-stage compression, with inter-cooling between the first and second stages, is most efficient for capacities above about 400 cubic feet per minute. Below this figure, however, the advantages of two-stage compression were offset by the greater initial cost involved. Messrs. Worthington-Simpson have now manufactured a range of compressors which render it commercially practicable to realise all the advantages of the two-stage cycle in compressors ranging from 400 down to 20 cubic feet per minute capacity. An example of this range of compressors is illustrated. It is a two-cylinder machine of "V" design, typical of sizes up to about 80 cubic feet per minute. The cooling of both cylinders and intercooler is effectively carried out entirely by air, a forced draught being created by a fan. The radial cylinder arrangement imparts not only compactness to the machine, but also minimises vibration, and only the lightest foundation is necessary.

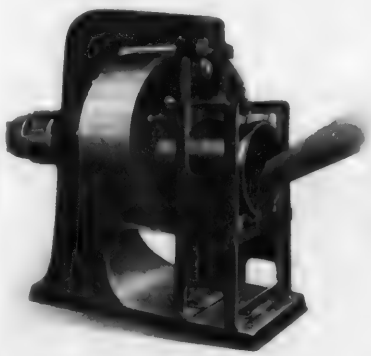
New Bean Cutting and Cherry Stalking Machines

The Lazenby and Ridgwell Canning Machinery Co., Ltd., have produced a new automatic bean cutting machine. The machine, which is illustrated on this page, will produce 2 tons per hour of diagonally or longitudinally cut beans and, although the beans are thus cut in mass production, the cut is uniform and clean. In the new cherry stalking machine, the cherries pass from the inlet hopper on to an arrangement of wire screens where the bunches are divided into single cherries. These roll on to a 6-grooved incline where the stalks are removed. The machine is easily adjusted for any size or variety of cherry and has an output of 10 cwt. per hour.

TRADE LITERATURE RECEIVED

A Pressure Cooker and Cooler for Canning

Food Machinery (Mather and Platt), Ltd., have issued a pamphlet describing a pressure cooker-cooler designed to assist the canner who wishes to handle food products at much higher temperatures than is possible with the retort or stationary cooking. On leaving the seamer each can enters the cooker at the higher temperature and continues in this for a predetermined period, after which it enters the cooler under pressure and is cooled and discharged ready for the stores. This continuous process ensures that the treatment of every can is the same and is under control.



The Bean Cutting Machine of the Lazenby and Ridgwell Canning Machinery Co., Ltd., which will produce 2 tons per hour of diagonally or longitudinally cut beans.

The Cleaning of Glass Containers

Machines for cleaning glass bottles or jars which are used as they come from the glass manufacturer or which have been stored in the bottler's plant for some time before use, are described lucidly in a pamphlet issued by the Karl Kiefer Machine Co., of Cincinnati, U.S.A. In addition to machines for rising by water, sterilising, and drying, some new machines have been designed for cleaning, by means of compressed air, bottles and jars for packaging food products, chemicals, etc. These machines, an automatic rotary bottle cleaner, handling 120-140 bottles per minute, and an air line jar cleaner, effectively remove dust, fibres, glass slivers, etc., from new glassware by a strong air blast.

Silent Sifter

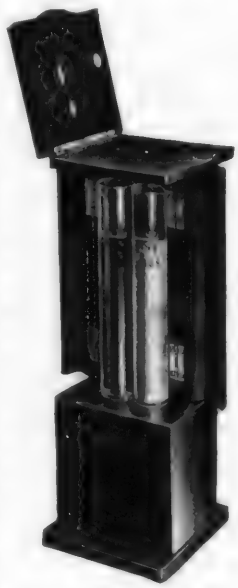
A leaflet has been issued by Blake, Barclay and Co., Ltd., describing their silent sifter for grain, sugar, and other granular or crystalline material. The machine is noiseless, self-contained, and the wood-framed screens can be quickly changed, being held in place by easily manipulated fastenings. Dimensions of machines with outputs of 15 and 25 tons per hour respectively are given.

"Flavours for Foodstuffs"

This is the title of a list issued by A. Boake, Roberts and Co., Ltd., of their products intended for the confectionery and allied trades. A descriptive note of each essence is given, and also an indication of the foods for which it is particularly adapted, and its recommended dosage. In addition to this comprehensive list of essences, a catalogue of harmless colourings, sesqui-terpeneless and terpeneless oils, essential oils, fine chemical and sundry materials is appended.

The B.D.H. Lovibond Nessleriser

British Drug Houses, Ltd., have issued a pamphlet on colorimetric analysis with the B.D.H. Lovibond Nessleriser. The instrument consists essentially of two hollow columns supporting a pair of standard Nessler glasses placed above an opal glass reflector and below a detachable rotating disc. The disc incorporates nine standard colour glasses, each of which passes centrally over the left-hand Nessler glass containing water or a blank test and which matches the colour produced by adding the reagent to a solution containing a definite quantity of the substance which it is designed to determine. The coloured liquid actually produced in the test is placed in the right-hand Nessler glass and the disc rotated until a colour match is obtained. Separate leaflets describe the determination of ammonia, chlorine, iron, nitrites, *p*H values, phosphates and silica by means of this instrument.



The B.D.H. Lovibond Nessleriser (open).

"Teon" Belting

Fleming, Birkby and Goodall, Ltd., Halifax, England, have issued a booklet entitled *The Driving Code*, which gives a considerable amount of useful information to users of belting. The company manufactures Teon belting, but, in addition to reviewing its properties, the booklet contains a mass of information for users of belting.

Another product is the Endless Veeteon Vulcanised V-Rope in which the tension member of strong cord is embedded in scientifically compounded rubber and both are protected from external wear by a few plies of fabric built specially for the purpose.

Pass-out Steam Engines

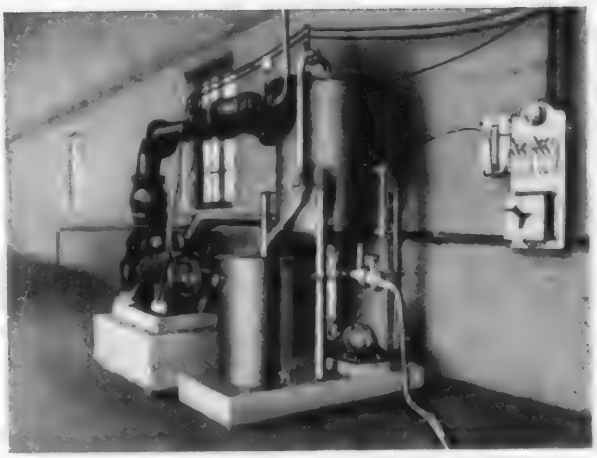
Ashworth and Parker, Ltd., have issued a pamphlet describing their pass-out steam engines, including a discussion of the principles underlying the pass-out gear and photographs of commercial installations of the engines. It is claimed that the gear gives the most economical working under each and every output and demand for process steam.

Fine Chemicals Price List

A new price list of fine chemicals has been issued by L. Light and Co., Ltd., cancelling previous lists. The list contains about 400 chemicals, including essential oils and other products of interest to the food industry. In some cases, a short note on the properties of the product and a reference to the literature are included.

Planned Lighting

The latest number of *The Reflector*, published by Benjamin, Ltd., contains numerous examples of their lighting systems installed in various factories. These installations are well illustrated by photographs, which show clearly the effect of efficient interior and exterior lighting.



A 50,000 B.T.U. Plant of the Vacuum Refrigeration, Ltd.

"Government Publications"

The new booklet of this title replaces the Monthly List of Government Publications and the Monthly Circular: A Selection from Recent Publications. It will be published monthly, and a consolidated catalogue for the complete year with a full index will be issued as soon as possible after the close of the year.

Belting

A booklet, entitled 75 *Years of Progress*, has been published by J. H. Fenner and Co., Ltd. It contains details of their various types of belting, including leather, rubberised woven, and "V" rope drives.

Refrigeration by Vacuum

A brochure recently issued by Vacuum Refrigeration, Ltd., gives a description of the theory underlying refrigeration by the vacuum system and of the plant itself. This system of refrigeration is particularly suitable for use with air conditioning plants, and for direct refrigeration such as required by the brewery, dairy, chocolate, confectionery, and biscuits trades. It is to be noted that the system does not involve the use of noxious fluids, and this is naturally of special appeal to the food industry.

"The Bi-Monthly Messenger"

The March-April issue of this journal, published by Callow Bros., Ltd., of Liverpool, flour millers and bakers, includes practical notes on the preparation of muffins, hot-cross buns, and a new malt loaf, in addition to the usual features.

Avery's tinplate Weighing and Sorting Machine.

Grading Tinplates

W. and T. Avery, Ltd., have produced a tinplate weighing and sorting machine, which is described in a recently issued leaflet. Any of the standard sizes of sheets may be dealt with by the machine, from a weight of approximately 10 oz. up to a maximum weight of 5 lb. by divisions of ¼ oz. Provision is made to deal separately with plus or minus variations from zero up to 10 per cent. by divisions of ½ per cent. The predetermined weight is first set, then the selector gear for the permissible light or heavy tolerances. Any sheets within the set range are passed into the correct group and those lighter or heavier are automatically sorted into light and heavy groups. The machine deals with up to 20 sheets per minute.

FOOD, HEALTH AND INCOME

Food, Health and Income: Report on a Survey of Adequacy of Diet in Relation to Income, by Sir John Boyd Orr, the authority on the science of nutrition, has just been published by Macmillan and Co., Ltd. This report is the result of various recent enquiries on nutrition, including that of the Market Supply Committee and of the Rowett Research Institute, combined with previously collected information.

As stated in the report, " while it is economically desirable to make agriculture prosperous, it is equally desirable to ensure that the food supply of the nation is sufficient for health and is available at a price within the reach of the poorest ".

The report is unique in that it is the first attempt to form a picture of the food position of the country, showing the relationship of income, food and health. As such it cannot be overlooked by Food Manufacturers, and if not possessed by all, the book should be read by all or at least some account taken of the matter contained in it. No Food Manufacturer can afford to underestimate the growth of a diet-conscious public, and as more is known about nutrition, public interest will become more critical.

The Four Stages of Investigation

The investigation is made in the following four stages. First, the total national supplies of the main foodstuffs were estimated. Secondly, to form an idea of the nature of the diet in different sections of the community, the whole population was classified in six groups according to family income, and an estimate based on family budget data was made of the consumption of the various foodstuffs in each of the groups. Thirdly, the composition of the average diet of each group was examined, the amounts of each of the constituents present being compared with the amounts required for health. Fourthly, the state of health of the country was reviewed to get an idea of the extent to which inadequacy of diet is reflected in poor physique and ill-health.

With reference to the second stage, the report states that the method of grouping the population according to income is new and may be open to the criticism, among others, that it over-emphasises the importance of children as an economic factor affecting the standard of living. " The basis of the grouping is the total family income divided by the number of persons, including children, supported by it."

In the fourth stage, it should be noted that optimum not minimum requirements are considered, optimum requirements being based on the physiological ideal, which is defined as " a state of well-being such that no improvement can be effected by a change of diet ".

National Expenditure on Food

It was found that the nation spends roughly 9s. per head per week on food, the total national income for 1934 working out at about 30s. per head per week, and expenditure on food accounting, therefore, for less than one-third of the total national revenue. Nearly one-half of the total expenditure was accounted for by meat, fish, eggs and cheese, the sources of animal proteins, but sugar contributed more than vegetables, other than potatoes, although vegetables " are more important for health than sugar ".

Although there has been a rise in the standard of living in the last 100 years, this has been accompanied by a decrease in the percentage of income spent on food. The most striking fact is that sugar consumption has increased fivefold and " from the nutritional standpoint this increase in the consumption of sugar is not so desirable as an increase in certain other foodstuffs, such as milk, would have been ". The price of milk is more than double what it was 100 years ago.

Recent Improvements in Diet

With regard to more recent changes in diet, there has been a substantial increase in the consumption of most of the principal foods since before the war, with the exception of wheat flour and potatoes. The largest increases have apparently been in fruit, fresh vegetables, butter and eggs, and it may be said on the average that " the national diet improved between 1900 and 1934 ".

Consumption of Particular Foods at Different Income Levels

The examination of the consumption of particular foods at different income levels shows that the consumption of potatoes and flour is remarkably uniform in all groups except in Groups I and VI, the groups of lowest and highest income level. In both of these it is slightly lower than in the four middle groups comprising 80 per cent. of the population. The curve for the consumption of expensive foodstuffs, milk and eggs, rises steeply in Group VI, but in the lowest group " there is no indication of any substitutes "—for low consumption of potatoes and flour—" nor indeed is there any cheaper food which could be substituted for potatoes and bread ".

As the report has it, " it looks as if either the purchasing power of this group is so low that the consumption of even the cheapest foodstuffs is limited or, what is more probable, the appetite in the lowest-income group is below the average. One of the first signs of sub-optimal nutrition is diminished appetite."

When total fats are grouped together a steady rise is shown from Group I to Group VI, the individual graphs for margarine and butter showing that as income rises there is a change over from margarine, which is cheaper than butter. From the graphs the consumption of all other foodstuffs, vegetables—excluding potatoes—fruit, cheese, meat, fish, eggs, sugar and fresh milk, show a rise with increase in income, the steepest gradient being that for fruit.

Complete Inadequacy of Diet in Group I

From the comparison of these diets with standards such as Stiebeling, it appears that the average diet of Group I is inadequate for perfect health in all the constituents considered, while in Group VI the standard requirements are exceeded in every case. In between these two groups there is a more or less gradual change. Fifty per cent. of the population are apparently living at a level of nutrition which is adequate.

The report points out that the fact that the average diets of the lower-income groups are inadequate does not mean that " these people are starving or suffering from such a degree of ill-health as is recognised in the term disease ". Although these diets may be sufficient to maintain life and a certain degree of activity, they may yet be inadequate for the maintenance of the " fullest degree of health which a perfectly adequate diet would make possible ".

The Results of Inadequate Nutrition

The report goes on to justify this statement. It is found that rickets, bad teeth and anæmia are fairly widespread in the lower-income groups, the only groups in which extensive observations have been possible, and in these groups growth is slower. Recent observations seem to indicate that non-pulmonary tuberculosis is less frequent in children who drink relatively large quantities of milk than in those who consume little milk. With regard to adults, the mortality rate from tuberculosis amongst occupied males was nearly three times as high for unskilled labour as for the higher ranks of business and professional life, and it is probable that the most effective line of attack on tuberculosis is by diet improvement.

From recent tests on animals under experimental conditions and children under ordinary conditions of life, it seems that it would be possible to effect a considerable improvement in the health of the children of lower-income classes by improving the diet, taking into consideration differences in health and physique of different classes due to heredity and environment.

Conclusion

In conclusion, the findings of the report obviously open up a prospect of still further improvement. Such improvement can only follow on increased investigation and discussion of the most searching kind. As the report has it, an entirely new situation has been created demanding economic statesmanship.

The vast amount of correspondence in daily papers recently on this subject of nutrition is evidence of a national awakening to the need for universally improved national diet. But even with precise facts about the results of inadequate diet, the knowledge of a completely adequate diet, the wherewithal of all classes to buy correctly, either through augmented income or decreased expenditure, there will be the necessity for educating large masses of the population in order that they may buy wisely rather than whimsically. M. E. N.

Food, Health and Income: Report on a Survey of Adequacy of Diet in Relation to Income. By Sir John Boyd Orr. 1936. *Published by Macmillan and Co., Ltd. Pp. 72. Price 2s. 6d.*

MEDICAL RESEARCH COUNCIL AND NUTRITION

The Report of the Medical Research Council for the Year 1934-35 opens with an account of the Application of Modern Knowledge of Nutrition. This is of interest in connection with our Editorial Comments and with the review of Sir John Boyd Orr's report on *Food, Health and Income* published on the opposite page.

The Medical Research Council feel that the public are becoming more interested in nutrition. No longer does new knowledge fail to find effect in the life of the people. The Council are particularly pleased to note the extension of cheap milk facilities to large numbers of schoolchildren in this country and also to note that this tendency is international, as is revealed by the great interest shown by the Assembly of the League of Nations in the subject of nutrition.

During the period of its existence, the Council has assisted towards many practical discoveries connected with nutrition. They include the elucidation of the nutritional ætiology of rickets; the discovery of the calcifying vitamin now known as vitamin D; the initiation of financial support of investigations in the standardisation of vitamins, making it possible for these vitamins to be discussed universally in terms of units; the placing of the prevention or cure of rachitic children on a firm basis; important investigations demonstrating the need to supplement diets of growing children with milk and other substitutes; nutritional investigations on anæmia and goitre.

The Council feel that it is clearly outside their duty and capacity to conduct a crusade of conversion to the acceptance of newly acquired knowledge even when it affects the general health of the community. Discoveries in preventive medicine usually require great public interest and legislation before they become effective, especially when they touch the economic interests of the country. The Council therefore warmly welcome the awakening of the public to the importance of proper feeding.

Essential nutrition teachings which will help the community are felt by the Council to be reducible to a few simple statements. The younger the child the more essential is correct feeding for proper growth and health, the new teaching to be also applied to the case of the pregnant and lactating mother. Proper feeding of the infant and child of preschool age is actually more important than improvement in the dietary of schoolchildren. Breast-feeding is of a higher value than has been previously believed, and ought to be more extensively adopted and continued for longer periods. The broad requirements of diet can be simply stated by saying that more milk, cheese, butter, eggs and vegetables ought to be consumed. Milk ought to be the chief drink for children, especially in early years, while bread and other cereals should in these early years be greatly *reduced*.

LORD LINLITHGOW LOOKS INTO THE FUTURE

Speaking at the London Provision Exchange Dinner on February 26, Lord Linlithgow attempted to outline the challenge which would have to be met by the Exchange in the future and to suggest a line of attack. He spoke of the efforts with regard to trade of Mr. Bruce, Dr. Burgin, Mr. Massey and Mr. du Toit, and pointed out that the more efficiency was urged upon the great producer organisations at home and abroad, the more inquisitive would they become about inefficiencies and inequalities of the distributive system in and through which they had to work.

Referring to Mr. Bruce's memorable speech at Geneva, advocating the marriage of health and agriculture, Lord Linlithgow said that the health of the next generation was in the hands of the present generation and that it depended for the most part upon ensuring that children and their mothers had enough of the right food. It would pay them, with the prospect of a falling population, to build healthy bodies rather than to patch up diseased ones. He felt that when public opinion did awake, pressure would be overwhelming and it would lead to far-reaching changes in the distributive trades as they knew them to-day. Changing habits of men and women would bring about striking developments which at the moment seemed to be outside the range of practicability. To quote his own words: "The increased use of the telephone and of transport facilities; the coming of the cinema and of the B.B.C.; the urge of city dwellers to get out into the country, if only for a day's hiking; the improvement in education; the increase of leisure and of the knowledge of how to use it; the determination of working women not to be turned into middle-aged drudges at thirty-five; and so on. Consider the extent to which these things have already altered the demand for food, and how much of the food sold to-day is already wholly or partially cooked, whether it be tinned fruit or ham, soup or cereals."

As an example he also asked them to imagine what might happen if "the baking industry in London were to be centralised in half a dozen great establishments closely, perhaps mechanically, integrated with the anterior process of flour-milling, and supplying not only London but the whole of South-east England with bread. Suppose that these great manufacturing units were to start in a tentative way to use their resources of power, labour and transport to supply cheap cooked or partially cooked meals direct to the consumer's doorstep. Are you so certain that it might not meet or create such a demand for those seeking relief from the drudgeries of life as to change the buying habits of the working population within a generation?" Although he thought that this might well be an exaggeration, he did feel that co-ordination, perhaps the centralisation, of manufacture, processing and wholesaling of foodstuffs was only just round the corner.

The challenge was to be met by corporate as well as individual expression. They must move as a disciplined force with an ordered plan of advance. He believed with Lord Kelvin that there could be no progress without measurement. Continuous measurement of efficiency in many directions was one of the first requirements of an organised trade. "In the modern world a trade such as yours should not only expect, it should demand, continuous expert investigation into its methods, and it should be determined to secure the means of putting the results of the investigations into practice."

He asked them to picture a national body representing, through local associations and national federations, every provision trader in the country—retailers, wholesalers, chain stores and importers, private traders and co-operative societies—doing for the provision trades as a whole what the Exchange did to regulate, control trading, aiming at efficiency, enforcing the reforms that enquiry had shown to be necessary, and while serving the interests of the Exchange, serving with equal zeal and activity the interests of the consumer and the greater national interest. He was sure that such a body was a practicable ideal.

Some Important Aspects of

THE CANNING OF MEATS

By T. Crosbie-Walsh, F.I.C.

MEAT CANNING, looked at superficially, seems to be a very simple matter. You take some meat (I am borrowing the style of the cookery book writers for the moment), put it in some salt solution with a little saltpetre, or, if you are daring enough to disregard the regulations, a little nitrite; you leave the meat in this pickle for a convenient time, from a few hours to a few months; you take it out, cook it according to the particular shibboleths you subscribe to; put it in a can or a glass container; expel the excess air either by heating or by means of a vacuum pump; hermetically seal the container and subject this to whatever heat you consider sufficient to sterilise or partially sterilise the contents. What more simple? Yet each large canner has a chemical and bacteriological laboratory, not only to control routine procedure but to tackle the various difficulties as they arise.

Interest in the Canning of Meats in this country is steadily increasing. It is a branch of Canning that is particularly important to the country and it ought to be encouraged and extended. The author discusses various aspects that should be specially borne in mind.—Ed.

Craftsman *v.* Scientist

There are still a good few people in the industry who discount the value of so-called scientific methods. Perhaps that is because preserving was, in the past, a craft carried out in a leisurely way without much competition, and the margin of profit was such that the matter of yields or losses did not arise to harass all and sundry concerned. In course of time production began to be speeded up and competition grew keener. It was found that to make 10,000 packs a day was a very different thing from making a hundred. New types of cans, new closures, new ways of sterilisation, of exhausting and a multitude of other things were introduced. Quite funny things started to happen which put the autocrat-foreman-canner out of his depth. Then science took a hand. But science didn't know much about meat packing and had to learn all about the *whys* and *wherefores* of the different methods. Curiously enough, science has not made up its mind about some of the things yet. However, it has made big production possible and is gradually eliminating the human element.

Obviously the craftsmen did not relinquish their position without a struggle, and science was often discredited. I think that was partly because the craftsmen and the scientists held themselves stubbornly apart, not realising that canning should be a combination of science and craft.

I have watched the evolution of scientific methods in the food industry from the time when a very large North American canning plant (which now possesses elaborate chemical and bacteriological laboratories with a large staff) considered that it was sufficiently served from the scientific side by the attendance of an assistant, once a week, from an adjoining pharmacist's shop.

The scientist occasionally shone when he was able to put right, in a spectacularly and apparently easy way, some difficulty which had arisen. Difficulties occasionally did occur, and in the old days everyone had a shot at solving them, from the general manager to the youngest office boy. But it was difficult to convince the business side of the value of routine control. It was not possible to say what might have happened *if* every detail had not been rigorously and meticulously controlled. There were comparative records of yields sometimes available, but usually these had to be compiled by the very person interested, and the figures, however accurate, sometimes failed to "get across". I am inclined to believe that, in the early days, the scientist failed rather to appreciate the culinary side just as badly as the factory side was suspicious of the scientific side. There are still lingering signs of a lack of *liaison*, but great progress has undoubtedly been made.

Bacteriology is Important

Bacteriology is a science which has not been popularised and is not a "subject" for school certificate examinations as are chemistry and physics, although it seems to me that a good working knowledge of the nature of bacteria would be of more use, even to the future mothers of the race. A superficial knowledge of bacteriology would ensure the washing of hands after certain unavoidable daily necessities. No longer would the latest baby be allowed to have its hands grabbed by visitors, whose own fingers are well supplied with a choice selection of flora from door handles, train and omnibus straps, residues from numerous handshakes—which choice selection is promptly transferred to the mouth of the hapless infant.

It is not therefore surprising that many people fail to realise the significance of many precautions which are dictated by bacteriological considerations. The meat canner is beset with micro-organisms in the meat he uses, in the

dust which blows into his factory, on the hands, boots and clothes of his operatives, in the water, salt (and even the bags in which his salt comes) and other materials he uses. He relies upon killing the whole family of microbes in one fell swoop in his "sterilising" operation, but if he does not keep the numbers down (it is easier to kill 10,000 microbes than 10,000,000) he will speedily find that he will be obliged to lengthen his retorting operation and run it at a higher temperature, which will play the very devil with his product, making the gelatine lose its jellying properties, denuding the bundles of meat fibres of their natural gelatinous properties, and producing a stringy, unattractive pack. He will be reminded, perhaps, that certain spore-forming bacteria have a peculiar habit of increasing their resistance to heat under favourable circumstances.

Cleanliness and Disinfection

The need for cleanliness could hardly escape the criterion of any canner, but it must not be mere superficial cleanliness. The workpeople should not only have ample provision made for washing but should be compelled to do it. Hot water is a cheap commodity in a factory, and such refinements as nail brushes and carbolic soap should be added. It will be found that the standard of personal cleanliness of operatives will be raised by the provision of additional refinements. The floors of the factory should be washed down each evening with soda solution. Wooden, concrete or iron vats, after being used, should be thoroughly cleaned and left full of water.

The canner is sometimes puzzled to know what disinfectant to use. Anything that is poisonous or that would confer a taste to his product is of course ruled out. In a factory of any size, an apparatus for preparing electrolytic sodium hypochlorite is very useful. Large quantities of disinfectant may be prepared from common salt at little expense after the preliminary outlay. The final product of decomposition of sodium hypochlorite is common salt. In the proportion of 1 : 1,000 solutions of the disinfectant will attack clean iron and steel. Brass, nickel, monel metal, aluminium, zinc and tin are comparatively unaffected. Wooden tubs, rubber, linoleum and composition floorings are not damaged. Another valuable weapon in the canner's armoury is the steam hose, especially for getting access to difficult corners. Those difficult corners are inhabited by micro-organisms with remarkable fecundity.

It is, perhaps, unnecessary to suggest that raw meat, be it fresh or frozen, should be stored under clean conditions. Air should be given free access to it. If it is stored in a place where flies can gain access to it, these may be kept away by the use of electric fans. These may tend to dry the surface of the meat and to discolour it, but this effect will be speedily remedied during the subsequent operations.

Pickling

There are two principal methods of pickling meat. The first, which is the one usually employed in this country, is to pickle the raw meat and parboil afterwards. The time occupied in pickling may vary within very wide limits, provided that conditions of salt concentration and temperature are suitable. The second method consists of cooking the meat first and putting it, whilst still hot, into hot brine. This is sometimes called the "quick cure", as meat may be in the can within six hours of putting it in the brine.

The product from the hot cure is somewhat different from that produced by the cold cure. It lacks to a large extent those subsidiary flavours which can only be produced by bacterial action, and it is notably less acid. Surprisingly enough, however, towards the last stages of the hot cure, when the pickle has cooled to about 50° C., one or two species are found to flourish and no doubt act on the meat. The difference between the products made by the two cures tends to decrease considerably during maturation in the can. The hot cure was developed with a view to taking advantage of the extractives emerging from the meat during the parboiling process.

In the cold cure, the cooking, being done after the meat had emerged from the pickle, produced a liquor in which salt predominated in an overwhelming degree. The attempt to prepare a meat extract from this involved a complicated system of de-salting. The final result was a still salty extract of poor quality.

When raw meat is parboiled prior to pickling a very high-class extract is obtained. In either case, the parboiling is in no way an attempt to rob the main product—the beef itself—of its extractives. Parboiling has to be done, in any case, in order to expel excess moisture from the meat. There is about 40 per cent. loss of weight, due to moisture, during the parboiling process. If raw meat, either pickled or otherwise, is put into a can and sterilised, the result is a kind of stew, with pieces of meat swimming in it, together with muddy-looking coagulated albumen.

Cold Process Pickle

The cold process is employed in cases where the elaboration of extract of beef is not desired. It is only when very large quantities of meat are being handled that it would be worth while to make the extract, as it involves expensive plant and is a complicated business.

The pickle for the cold process consists of water in which varying amounts of salt, saltpetre or nitrite, and sometimes sugar and spices are employed. The salt content of a pickle cannot be reduced to a formula. It depends upon the size of the pieces of meat, the time of pickling, the temperature during pickling, and the nature of the product desired. For instance, a mild cure for tongues would involve the use of a pickle of not more than 50° brineometer, whereas for sundry other articles, a brine of 80° might be required.

The pickling time seems to depend very much upon the "taste and fancy" of the canner. I recently inspected some meat which had been three months in brine, intended for canning, and found it to be in quite good condition. Obviously, a long cure requires low temperature. Some canners use the pickle over and over again for about six months without treatment. In my opinion, it is not advisable. In the first place, as time goes on, a direct brineometer reading will not indicate

the correct salt content. The dissolved meat solids and albuminous matters will represent a constantly higher reading, so that if salt is merely added to make up to the original reading, the pickle will be weaker and weaker in salt. This means that the meat is undergoing a very different treatment at the commencement of the six months from that it receives at the end, and the finished product will be quite different. With pickles used thus, the saltpetre should be kept constant, and there is only one way to keep the nitrate and nitrite constant—that is, by analysis. Many of the troubles encountered are caused by the gradual building up of nitrate and nitrite in pickles.

Standardisation of Products

One of the aims of a manufacturer should be the standardisation of his products in order that their quality and characteristics shall be constant. Nothing militates against a canned product so much as variations in quality. It is surprising how consumers will hit upon some little characteristic of a favourite product—it may be quite an unimportant characteristic—and look for it every time it is purchased. If, by any chance, it fails to appear then that customer is lost.

I do not advocate using pickle more than once without treatment. After the meat has been removed the pickle should be boiled. This coagulates the albumen and sterilises the pickle. The clear solution may be filtered off and made up to the requisite strength with salt and saltpetre. The amount of steam involved in such treatment is negligible. The advantage of utilising this used, regenerated pickle is the prevention of loss of extractives by reason of the extractives already present. By actual experiment it has been found that much less extractives are lost when extractives are present. The retention of extractives of meat has a marked influence upon the quality of the pack it composes.

Sterilisation of the pickle renders it necessary for a relatively small number of micro-organisms to get to work, but this happens in a few hours. As the used pickle generally contains a residuum of nitrite the colouring starts at once. The extractives in the used pickle increase up to about the sixth time of using, when they become more or less constant. The lactic acid remains constant after the pickle has been used two or three times.

The following are some figures showing analytical data relating to the pickling process. The pickle used was made up *each time* to 9 per cent. salt (sodium chloride) and sodium nitrite to 0·5 part per 1,000. It was used twenty-five times and there were no appreciable variations after the fifth time of using.

PICKLE DATA.

No. of Times Used.	*Total Solids less Salt. (Per Cent.)*	*Salt. (Per Cent.)*	*Total Creatinine. (Per Cent.)*	*Acid as Lactic. (Per Cent.)*	*Sodium Nitrite. (Per Mil.)*
1	1·26	6·18	0·114	0 09	0·22
2	1·57	5·63	0·135	0·11	0·21
3	1·09	5·84	0·15	0·13	0·20
4	2·12	5·88	0·15	0·14	0·21
5	2·30	5·66	0·16	0·15	0·19
6	2·31	5·80	0·18	0·15	0·22
7	2·33	5·66	0·18	0·15	0·23

Regeneration Equipment

The installation required for the regeneration of pickle is simple. The used pickle is pumped to a sterilising tank, with steam coils, preferably above the level of the pickling vats. A supplementary open steam coil is required for starting the sterilising operation. Open steam is used until the albumen has coagulated. This is then turned off and the closed steam coils used for the rest of the time. The reason for this is that if the closed steam coils are used at the beginning, the albumen, on coagulating, coats the coils with a non-conducting material which will prevent the contents of the tank from boiling. There will be an increase in volume due to condensation from the open steam coil, but this does not exceed the volume of pickle taken up by the meat in the pickling operation. So that, if the same quantity of meat is pickled each day, there will be no excess of pickle. The boiled pickle is filtered by means of flannel bags (or, if the quantity is large, by a filter press) and run into the cooling and regenerating tank. Here the percentage of salt and saltpetre are readjusted. The salt (sodium chloride) may be adjusted by brineometer, allowing about 3° for the meat extractives. A nitrite present must be determined by analysis. A colorimetric test is adequate and can be rapidly carried out. It is the *nitrite* which is the significant salt and not the saltpetre, from which it has been derived and which is inert so far as meat is concerned.

(*To be concluded.*)

THE FOOD INDUSTRY IN RUSSIA

ACCORDING to the latest monthly review of U.S.S.R. trade, the food industry in that country more than fulfilled the annual plan for 1935 by December 1 last, the output by that date having reached 102·4 per cent. of the annual programme. The production of all foodstuffs showed an increased output during 1935 as compared with 1934. Expressed in metric tons some of the major increases were: Granulated sugar 349,600, lump sugar 224,700 (total for sugar 574,300), fish and fish products 164,000, meat and meat products 131,700, vegetable oils 53,000, confectionery 48,400, and dairy produce 37,000.

Some of these figures are really formidable when it is remembered that they represent an annual increase. It is also stated that a constant reduction in food prices is taking place, which of course could well happen in comparison with prices ruling in early days of the Soviet experiment.

PEANUTS and PEANUT BUTTER

By E. J. THOMAS,
of Toronto, Canada

THE PEANUT is not exploited—that is, on its own merits—in England to nearly the same extent as it is in the United States and Canada. As a component of many foods and confections it has, of course, been used in the trade for a number of years, but generally the humble "monkey nut" in its own right is not as familiar to the Englishman as it might be.

It is, however, a valuable food and lends itself well to man's efforts at improvement upon its physical qualities which, in the raw, are not especially attractive. As a result the peanut enjoys a steady year-round popularity on the Western Continent where it is offered the consumer in a variety of forms.

Many firms now specialise in peanut processing plant which has been designed to reduce handling to a minimum and to provide free access to all parts for thorough cleaning—an important feature. Choice of plant materially depends upon the quantity and style of goods it is intended to produce. On this side of the Atlantic the most popular forms in which the peanut is marketed may be roughly assessed thus:

Peanut Butter. In the past, fabrication of this product from foreign oils, cereals and damaged and wormy nuts was not unknown. To-day, however, the consumer expects and usually gets 100 per cent. sound roasted nuts, seasoned with salt.

Whole Roasted Peanuts. These are simply peanuts roasted whole in their familiar crinkled shell.

Fried Nuts. These have been shelled and may or may not be blanched and are either whole or split, fried in a suitable medium and salted.

The Nuts

A word about the nuts themselves may not be out of place. Scientifically known as *Arachis hypogeæ*, and more familiarly as ground nuts or earth nuts, they are, strictly speaking, legumes, and are cultivated chiefly in South America, China, Japan, Java, India, and Spain. The variety hailing from Spain and obtainable also from China under the trade designation of "Chinese-Spanish style" are particularly popular for frying, on account of their tenderness. In buying, the nuts are graded according to the average number of meats per ounce, and are imported in 100 lb. sacks, shelled, but with the red inner skin intact, or unshelled. The buyer must beware of dirty skins, traces of mould with the accompanying stale taste and musty odour, and any traces of grubs or grub castings and borings. The meats themselves should be white and firm, with no tendency towards either flabbiness or a shrivelled brittleness.

Peanut Butter

For the production of peanut butter three units of plant are usual. These are the roaster-cum-cooler, the blancher, and the grinder. The roaster is usually a gas fired, cylindrical revolving oven fitted with vanes so designed as to keep the nuts constantly mixing during the operation of roasting; and to permit of rapid automatic evacuation of the batch. An efficient exhaust fan is an essential. Manual control of the roast is quite practical. No two batches of nuts are identical, and such variations as are necessary in respect of the duration of the roast and oven temperature, and compensation for such varying factors as the size of the meats, their moisture content, the desired final shade and development of flavour, are best left to the operator. Too rapid application of heat causes the nuts to exude minute oil droplets upon the surface, which char, and form unsightly black specks. On the other hand, too low a cooking temperature must necessarily prolong the roast, and dries out and toughens the meat to the detriment of the final product.

The cooler, into which the batch when cooked is charged, is a shallow metal tray whose sides and false bottom are perforated and through which, via the batch, air is sucked. This hastens cooling, preventing deepening of colour as a result of auto-cooking. When cooled, the meats are conveyed to the blancher, which removes, by the action of a rotary brush upon a corrugated plate, the now brittle skins, and, in discharging them, removes most of the rancid-oil-containing hearts or embryos. One further step is advisable—namely, the arrangement of two suction pick-ups. One is adjusted to remove impuri-

The illustration at the top of the page shows a great mound of peanuts being prepared for export at Dakar, Senegal, in N.W. Africa. This is truly a peanut vendors' paradise.

ties, such as pieces of paper, bits of jute and wood chips of lighter specific gravity than the meats; the other to pick up the meats themselves, discarding foreign matter of greater density, such as stones and nails. Good Chinese nuts have been found to yield as much as 1 lb. of impurities—mostly gravel—per five tons. Finally, the batch passes to the grinder—the older stone mill being now largely replaced by the metal plate grinder, which, while grinding, incorporates the desired amount of salt and presents the now finished "butter" for filling into containers.

Shrinkage during processing is a factor that can vary with any of the conditions, such as the moisture content of the nuts before roasting, the type of nut, the efficiency of the blancher in removing the skins and the hearts, and the length to which the roast is taken. This last determines the colour of the product and its flavour, which is, of course, a matter of opinion. Twelve per cent. total loss is probably a fair average, accounted for thus:

Loss of skins (roughly constant)	4·75 per cent.
Loss of hearts (roughly constant)	2·75 ,, ,,
Loss of moisture (variable) ..	4·50 ,, ,,
Total average loss ..	12·00 ,, ,,

Whole Roasted Nuts

As regards whole roasted peanuts, little need be said, save that the general precautions in buying apply in this case as well as for the shelled nuts. They are roasted in much the same manner as the meats for peanut butter, followed by the usual quick cooling.

Fried Peanuts

Fried peanuts are more popular for dessert than the whole roasted nuts, and, as stated previously, may be cooked blanched or unblanched, "whole" or "split". Blanching is an operation for which special plant has been devised with particular care to guard against unduly rough handling and the resulting production of "splits".

If any quantity of nuts is to be handled it is economical to invest in a good cooker. Features such as a wire or perforated metal basket to retain the nuts; a reservoir, with pump-forced circulation and automatic filtration of the cooking medium; and a draining and rapid cooling unit, are indispensable.

The Oil

As to the medium itself, a mineral oil known technically as "slab oil" was once commonly used, but it is now more generally replaced by some vegetable oil or fat. Refined coconut oil with a melting point of about 80° F. and a negligible fatty acid content is as good a medium as can be obtained and forms an excellent bond between the nut and the salt granules. Maize oil too, a by-product obtainable from many corn starch refineries, gives good results and imparts a distinctive pleasant flavour to the goods, but, under certain conditions, may cause some little trouble by frothing. It is, moreover, often dearer than coconut oil. The medium should never be overworked, and a muddy colour and offensive odour at cooking temperatures are indications that its cooking life is ended. At this point it should be discarded and frequently is bought back by the original suppliers for refining for technical purposes. The absorption of the cooking medium depends upon the type of medium used, the fat content of the nuts themselves—which varies within small limits—and the immersion temperature of the medium. Further, the immersion temperature of the medium will depend upon the size of the batch and upon the type and size of the nuts themselves. It is, therefore, impossible to lay down any set rule on this point, but a temperature of 290° to 310° F. may be considered as average. The "end-point" of the cooking develops rapidly 6 to 8 minutes after immersion. Lastly, 4 to 5 per cent. of fresh screened salt is required.

Rancidity

It should be mentioned that heavy stocks of cooked nuts or peanut butter should not be carried. Rancidity attacks the fried nuts much sooner than the peanut butter. In the latter, however, separation of the solids from the oil occurs rapidly where the bulk is large. In this case, all that can be done is to subject the butter to a thorough whipping—almost any kind of batter beater if sturdy enough will suffice—to send the oil back into normal distribution. Due to the fact that rancidity will develop sooner in stocks that have been on hand some time and have been reconstituted in this way, it is wise to arrange some rapid outlet for this product, such as a number two grade at a cheaper price. If rancidity *has* set in, the stock is a dead loss.

In conclusion, it can be truthfully be said of peanut troubles, as of anything else, that prevention is better than cure. Meticulous cleanliness, no stagnation of raw stock or wastes, and careful buying are more economical in the end than pesticides. A reasonable expenditure on these aspects is well worth the peace of mind that comes in return from the knowledge that one's stock is free of the chief pest—the moth.

ILLUMINATED DRINKS IN THE U.S.A.

NEON tubes for stirring soft and certain other drinks are the latest idea for introducing colour in American restaurants.

Immediately the neon rod is put into the liquid, electrochemical reaction produces unusual florescent rays illuminating the drink in either brilliant red, green, blue, or according to any desired colour scheme.

A special composite table is used in connection with the lighting, but the chemical secret of the device is not revealed. The tubes are about 6 inches long.

CANNED FOODS from SOUTH AFRICA

Mr. A. Ll. Matthison and the South African Food Canners' Council

AT A luncheon given in Mr. Matthison's honour on February 6 at the Assembly Hotel, Cape Town, Mr. H. J. C. Stephan, President of the South African Food Canners' Council, was in the chair, and others present included Mr. W. Peters (H.M. Senior Trade Commissioner), Mr. F. J. Fahey (Chairman, Board of Trade and Industries), Dr. C. von Bonde (Director of Fisheries Survey), Mr. G. E. Williamson (The Metal Box Company of South Africa, Pty., Ltd.), Mr. E. Penso (North Bay Canning Co., Ltd), Mr. A. Appleyard (Vice-President, South African Food Canners' Council), Mr. W. Gant (Vice-President, South African Food Canners' Council), members of the Jam and Canning Section, members of the Crawfish Canners' Section, and Mr. J. L. Moore (General Manager and Chairman, Jam and Canning Section and Crawfish Canners' Section, South African Food Canners' Council), and Mr. J. W. Lamont (Secretary, Department of Commerce and Industries).

The Chairman extended a very cordial welcome to Mr. Matthison and paid a tribute to the important part that Mr. Matthison had played in the establishment of the British canning industry and in developing and fostering improvements in general canning practice. Welcoming other guests, the Chairman added that before asking Mr. Matthison to speak, he would call upon Mr. J. L. Moore, Chairman of the Jam and Canning Section and the Crawfish Canners' Section, to supplement his remarks and deal specifically with the question of extending the existing Empire partnership.

Mr. J. L. Moore

In the course of his remarks, Mr. Moore pointed out that since the adoption of the Ottawa Agreement, South Africa had materially extended her trade with the United Kingdom until to-day she is in the proud position of being recognised as Great Britain's second best customer. The Ottawa Agreement must be looked upon as a wonderful achievement, he said; and whilst the Agreement in some directions has not proved an unqualified success, it at least paved the way for further open and frank discussion.

Mr. Moore intimated that for some months the Food Canners' Council had been engaged in organising Dominion Canned Fruit, Dried Fruit, and Canned Lobster and Crawfish interests with a view to a series of conferences being held during the present year so that concerted action might be taken to assure the Empire packers of these commodities a greater share of the United Kingdom market at economic prices, and in this connection they hope to enlist the co-operation and assistance of the British canning interests, the Welsh tinplate industry, and the British Farmers' Union, so that they can jointly combat the prejudicial effect of foreign competition. Dealing with the question of the United Kingdom's import of canned fruit, Mr. Moore stated that in spite of the Ottawa Agreement, in 1934 the United Kingdom imported 8,600,000 cases of canned fruit, out of which foreign countries supplied 5,215,000 cases against the Empire countries' contribution of 3,385,000 cases.

Mr. A. Ll. Matthison

Expressing his thanks for the cordial welcome, Mr. Matthison conveyed the heartiest greetings of the National Food Canning Council of Great Britain. He wished to make a few remarks and offer some suggestions, mainly from his own point of view rather than as President of the National Food Canning Association of Great Britain. At the same time, he had reason to believe that his views would be supported by leading members of the trade and its allied branches at home. To-day as never before in the history of the Empire was it necessary and essential for this great Commonwealth of Nations to work together on lines of co-operation, reciprocity, and mutual respect and helpfulness.

Continuing, Mr. Matthison said:

"Now all of you here, like myself, are keenly interested as business men in the preserving and canning of foodstuffs. These foodstuffs cover a wide range of edible products, fruit, vegetables, fish, meat, sauces, etc. Practically everything eatable and drinkable is being canned to-day. In America they can rattle-snake and beer. We haven't any great output of snakes in Great Britain, but we are beginning to can beer and wine. Perhaps I have offered you a useful suggestion as to your snake problem.

"You are primarily, however, a fruit and fish canning industry, and it is here that I want to offer a few suggestions for your careful consideration. You all know better than I can tell you of the enormous advance in food canning during the last ten years in Great Britain. You know that the dietetic value of canned foodstuffs has been abundantly testified to by eminent medical men and food authorities. You know that the present-day method of preparing food for the can is more hygienic than home cookery. The *best* and only the best fruit and vegetables go into the can, and from the moment of picking all further processes are mechanical, scientific and hygienic. Sterilisation preserves the quality and flavour of the fruit and prevents contamination in the hermetically closed can.

"Up to ten or twenty years ago the U.S.A. supplied the great bulk of canned fruit to the world. To-day we have nothing to learn from America, or, rather, we are all learning all the time; but America and Great Britain and, I trust, South Africa are equal in their knowledge as to the best methods of growing, grading and canning foodstuffs.

Obliterate Trade Barriers

"Now the suggestions I want to lay before you, gentlemen, are based on the principles I ventilated in my opening remarks—namely, reciprocity, mutual helpfulness, and a policy of Empire preference. I suggest that the tariff barriers between our respective countries should be thrown down and all obstacles to mutual trading entirely obliterated. I wish

I could speak for every industry, but on this occasion must confine myself to the business of canning.

"I suggest that you should allow us to export to you, duty free, our coloured fruits—raspberry, strawberry, loganberry, blackberry, damsons—our garden peas, our vegetables, our herrings, whether in tomato or mustard sauce, and our bloater paste. In return you should be allowed to send us, duty free, your peaches, apricots, pears, pineapples and other tropical fruits, also tomato purée and peeled tomatoes. Just consider. We import into the United Kingdom, annually, 500,000 cwt. of canned peeled tomatoes. Why should not the bulk of this come from South Africa, our fellow-members of the Commonwealth, instead of mainly from Italy? Then there is a big import of tomato purée used for sauces and fish packs which you should be able to supply.

Establishment of Standards

"I suggest that your Association should establish standards for peeled tomatoes, which must be of high quality and flavour. You should, through your Research Department, issue licences to pack and export under strict supervision, and establish a National Mark for the product as we do in Great Britain.

"As for your peaches and apricots, why shouldn't you capture the bulk of the 111,000 cwt. which we annually take from California? There, again, is an opening for reciprocity between members of the Commonwealth. In so far as my humble efforts can serve, I would do my part in Great Britain towards making this mutual helpfulness a practicable and assured thing.

"A word as to research. In Great Britain, as you know, we have a most efficient and well-equipped Research Station, where the interests of canners and the allied industries are looked after. This Research Association, I am pleased to inform you, was founded under the directorship of my friend, Mr. Appleyard, and his co-worker, Mr. Hirst, who is now the Resident Director. These two gentlemen did a very great work for the canning industry in Great Britain in its infancy. When your own Research Station is established, I advise you to work in cordial co-operation with Campden. The main problems of canning are the same, whatever the country. Campden has accumulated great masses of information which should be of inestimable value.

A South African Research Station?

"Canners, in their own interests, should liberally support a Research Station. At Stavanger, in Norway, the sardine packers have a splendidly equipped and officered Research Laboratory. Every packer is compelled to subscribe by Government to this Station. He pays so much per case of fish packed. Thus, those who receive the most benefit pay the most, but everyone, however small, benefits. This is the kind of mutual helpfulness I should like to see established between our two countries, and, indeed, between all members of our Commonwealth.

"Finally, a word as to propaganda and publicity. There is still a lingering prejudice against canned food, in spite of the testimony to its value from medical authorities and eminent dieticians. You must play your part in eradicating this stupidity. . . . We endeavour to educate the public as to the food value of canned comestibles, we take up any challenge from ignorant or prejudiced persons, and deal quickly and effectively with the rare but dangerous food-poisoning scares, so often given undue prominence by a sensation-mongering press."

After reviewing the work of the National Food Canning Council in Great Britain, Mr. Matthison concluded: "In my opinion, there is a large potential buying public of canned foodstuffs still to be aroused and made conscious of their value. It is up to us all to secure these customers by the best methods of packing, scientific control, national marks, propaganda and advertisement. Make your slogan 'Only the best goes into the can,' and use every endeavour to prove it by the quality of your pack."

Mr. A. Appleyard, in moving a vote of thanks to Mr. Matthison, stated that as one who had been closely associated with the early establishment of the British canning industry, he desired to pay a tribute to the great work that had been carried out by Mr. Matthison, as it was largely due to Mr. Matthison's vision that the industry was founded and fostered on a sound foundation of efficiency linked up with scientific investigation and research.

Mr. Appleyard further stated that the South African industry had made a great deal of progress during the past few years, and although the export pack at the present time was a little over 100,000 cases, the pack was an excellent one which favourably compared with the world's finest canned fruit packs and that the industry was in a position to be materially extended as soon as Empire canned goods were placed in a position to meet foreign competition in the United Kingdom market.

In conclusion, he stated that he desired to thank Mr. Matthison for attending the luncheon and for his very interesting address which, he felt sure, would give much food for thought amongst those who had the interests of the Empire fruit growing and canning at heart.

CYCLOHEXANYL ESTERS AS FLAVOURING MATERIALS

As mentioned in the report on the British Industries Fair published in FOOD MANUFACTURE last month, Messrs. Howards and Sons, Ltd., of Ilford, have recently placed on the market four esters of cyclohexanol in a very pure state. These are the acetate, b.p. 175° C.; butyrate, b.p. 210° C.; valerianate, b.p. 218° C.; and phenyl-acetate, b.p. 140° C., at 4 mm. pressure. The last, which has a rosaceous odour, may prove of use in perfumery. The other esters promise to be distinctly interesting to manufacturers of artificial flavouring esters. It is noteworthy that saturation of the benzene ring has a most profound effect on odour. These esters do not smell in the least like those of the corresponding phenyl esters. On the contrary, froml the point of view of odour, cyclohexany esters must be classed with the esters of saturated fatty alcohols. Their odours are definitely fruity; but they are of a milder character than those of the corresponding *iso*-amyl esters, which they resemble to some extent. The odour of the valerianate is particularly attractive and recalls that of custard apples, a fruit which is now becoming so well known in this country that a demand for an artificial flavour of the custard-apple type may soon well arise. This ester might also be profitably employed in building up other artificial fruit flavours; while the aroma of the acetate suggests its employment in artificial pear flavours, and that of the butyrate in artificial apricot and raspberry flavours. We note that the manufacturers term these esters cyclo-hexan*ol* acetate, butyrate, etc. We suggest, in the interests of uniformity of chemical nomenclature, that they adopt the names cyclo-hexan*yl* acetate, butyrate, etc.

INFORMATION and ADVICE

Pearl Barley—Strawberries—Ice-Cream Bars—Cooking of Hams—Preservation of Green Walnuts—Fruit Sauce—Malt Sugar—Beer Substitute—Manufacture of Marzipan—Mould Growth—Powdered Fruit Flavour—Chocolate Glaze—Chutney—Potted Meats and Fish Pastes—Lemon Cheese—Grapefruit Juice—Research Association—Fish and Meat Pastes—Brawn

Pearl Barley

1,986. *We should be glad if you could kindly give us any information as regards the manufacture of pearl barley.* (Hull.)

The following particulars have been supplied by someone who is familiar with the manufacturing process:

One hundred parts of barley will give:

Coarse dust	.. .. ..	12·5 parts
Fine dust	.. .. ..	12 ,,
Pearl dust	.. .. ..	25 ,,
Pearl barley	.. .. ..	28 ,,

In making pearl barley the layers are successively removed, the outer layer being coarse dust and the next fine dust, which contains fat. The grain at this stage is known as "pot barley". The fine dust contains albuminoids, the third layer being less rich in albuminoids and fat. The remainder is known as pearl barley.

The following is an average analysis:

	Barley.	*Coarse Dust.*	*Fine Dust.*	*Pearl Dust.*	*Pearl Barley.*
Moisture	13·8	14·2	13·1	13·3	14·7
Proteids	11·1	7·0	17·6	12·1	7·3
Ether extract ..	2·1	1·7	6·0	3·4	1·2
Carbohydrate ..	65·6	46·8	50·5	67·2	75·2
Crude fibre ..	4·8	24·6	8·5	1·8	0·6
Mineral ash ..	2·6	5·7	4·3	2·2	1·0

Strawberries

1,987. *I have experienced rather a lot of trouble with some of the early strawberries from Holland last season, inasmuch as that after the jar has been filled, the strawberries remain almost white. They will not take colour, neither will the SO_2 boil out during the boiling period of about ten minutes; in fact, the SO_2 content of strawberries taken out of the jam was 230 parts per million. The only way I have been able to overcome this is by boiling the strawberry pulp overnight and to leave them soaking in colour, making them up the following morning, but this procedure gives the jam a very dead appearance. I should very much like to know what is causing the trouble, and if you can offer any suggestion to overcome the difficulty I shall be very much obliged.* (Manchester.)

The point raised is rather difficult. Regarding the lack of colour even after removal of some SO_2, it is just possible that pale strawberries are being dealt with and not the red varieties at all. If this is definitely known not to be the case then the lack of colour must be attributed to the excessive amount of SO_2 in the fruit pulp.

The removal of SO_2 is always more easily effected before the sugar is put in than after, as the factor involved in the evolution of SO_2 is the *p*H of the solution. But neither of these factors—*i.e.*, the original use of yellow strawberries or the excessive SO_2 content of the pulp—should be the cause of the inability of the fruit to take up colour.

The question arises; is the colour that is being used "fast" to SO_2, or are the strawberries in the pulp so hardened by the SO_2 treatment that the tissue is not in a fit condition to absorb the dye?

It is almost impossible to give any really useful advice without making an examination of the product.

Ice-Cream Bars

1,988. *We are greatly interested in manufacturing chocolate-covered ice-cream bars, and shall be glad if you could let us know whether we could begin with the manufacture of this line without installing any special machinery and without running into heavy expenses. The line being entirely new for this market, we should like to test the market in a small way before we see whether the line is likely to become a good seller or not.* (Estonia.)

We have been advised that no elaborate machine is needed for the coating of ice-cream with chocolate, unless, of course, the work is to be done on an extensive scale. The bars of hard-frozen ice-cream (they should be practically as hard as possible) may be dipped in the molten chocolate by means of a fork or some similar pronged instrument. The chocolate should be maintained at or about a temperature of 103° to 105° F. For this purpose it is best to use an electrically heated dipping pan, which is obtainable from any firm supplying caterers, pastry-cooks, etc. The bars of ice-cream should be dipped into the chocolate for about one second only, and should then be placed on pieces of foil to dry. This they will do in some eleven or twelve seconds. The chocolate has then "set", and the bars, after some half-dozen or so have been coated, should be wrapped in the foil and returned to the refrigerator or hardening room. The chocolate used for this covering work should contain a high percentage of fat, so that, on being melted, it will be sufficiently fluid. When the chocolate is first melted the temperature may be taken to 110° F., but when all the chocolate has melted the liquid should be cooled slightly to 103° F. or so before coating work is begun.

Cooking of Hams

1,989. *We shall be glad to know the lowest temperature at which we can cook hams averaging 14 to 16 lb., and the length of time required to cook same at this temperature. We can cook either by steam or water.* (Perth.)

The usual temperature is 180° to 200° F. for a sufficient time to allow the establishment of uniform temperature through the hams. This time depends on the size of the hams and is best determined by running a trial with a thermometer placed in the centre.

Preservation of Green Walnuts

1,990. *Some clients of ours have asked us to let them have particulars with regard to the preservation of walnuts for use by the pickling trade, and we should very much appreciate it if you would give us details as to how the brine, etc., should be prepared.* (London.)

The usual procedure is to place 3 cwt. of green walnuts without shells in a 50-gallon cask and head up. It should then be filled with brine of 3½ lb. salt per gallon of water.

Fruit Sauce

1,991. *We have been recommended to write you in connection with fruit sauces which we intend to manufacture in the future, and wonder if you can furnish us with any information on this subject.* (Ireland.)

The following is a typical recipe for this class of product, with which experiments should be made:

Fruit Sauce.

Dates	1½ boxes
Apple pulp	2 gal.
Tomato pulp	1 ,,
Onions	18 lb.
Garlic	2 ,,
Salt	4 ,,
Cayenne	1½ ,,
Ginger	1½ ,,
Vinegar (16 gr.)	26 gal.
Acetic acid (80 per cent.)	½ ,,

Peel and chop onions and garlic. Soak ground spices in water for 48 hours. Gently simmer all for 30 minutes. Pass through a fine sieve. Bottle at over 185° F.

Malt Sugar

1,992. *I shall feel obliged if you can tell me briefly how malt sugar is made, or refer me to the source whence the information may be obtained.* (London.)

Malt sugar is produced during the process of malting barley. The barley is then extracted with water which dissolves out the malt sugar, and it is afterwards concentrated or crystallised out.

Beer Substitute

1,993. *We would be obliged if you would advise us on the manufacture of a beer substitute to sell in the concentrated liquid form. What we have been working on does not seem to be quite satisfactory.*

Crushed beer malt	*1 lb.*
Hops	*2 oz.*
Extract of liquorice	*½ ,,*
Ginger	*½ ,,*
Sugar	*1½ lb.*

Water

Macerate for an hour, then very, very slowly bring to a boil. In this state it would reach the public with instructions. Dissolve by mixing with twice its volume of hot water. Then add cold water to make up to 3 gal. Now stir in yeast (special). Cover container with cloth and stand in temperature of, say, 65° F. for about 20 hours. Remove head by skimming. Bottle immediately, putting sugar at the rate of half a teaspoonful per pint. Store for a week.

We would be glad to have your opinion of this formula and any suggestions. (Dungarvan.)

We have always understood that beer is not made with sugar, and if you replace the sugar with 2 lb. of priming crystals, you should obtain better results. These crystals consist of glucose boiled to 290° F., and then poured into tin trays and allowed to cool. If, however, you prefer to buy these ready made, we can recommend a suitable source of supply.

Manufacture of Marzipan

1,994. *We would be greatly obliged if you could give us some information regarding the manufacture of almond paste, marzipan and similar products for bakers' use.* (London.)

We do not think that we could do better than to refer you to Scarborough's book, *Sweet Manufacture*, for information of this description.

Mould Growth

1,995. *I should be grateful if you could give me any idea as to the prevention of mould growth on preserves.* (Teddington.)

We understand that the best way to avoid mould growth is to treat the cardboard tops with an antiseptic.

Powdered Fruit Flavour

1,996. *Can you please supply or give me any information as to a product, "fruit flavour," put up, I am told, in exactly the same form as "Sprayed Milk Powder"? It apparently, so I am told, is largely used on the Continent.* (Surrey.)

We understand there are two types of such flavours, the first is based on starch and powdered gum, containing various synthetic essences, and the second, a more correctly termed "fruit flavour", is that obtained by spray drying various fruit juices. We have been advised that the preparation of an American product of this description was carried out by a spray-drying process under vacuum conditions so as not to spoil the flavour of the fruit.

Chocolate Glaze

1,997. *I should appreciate information as to the best medium for incorporation in a chocolate mixture to produce or maintain the gloss after chocolate has been warmed with fondant for dipping.* (London.)

The matter of glaze with these compounds depends on the particular ingredients used and on the balance of the recipe and method of incorporation. We, therefore, think that you definitely require technical advice on this subject, and would recommend you to consult a chemist.

Chutney

1,998. *We are afraid that the boiling of the waste, particularly the cauliflower, may interfere with the keeping quality of the chutney, and we should be much obliged if you could send us your opinion on this point.* (Derby.)

It is difficult to give you any useful practical advice on the point you raise, as much will depend on the amount of salt left in the vegetables. The more salt left in the better they will keep. At the same time you do not want the taste to be too salty. It is, therefore, worth considering whether you are removing too much salt.

Potted Meats and Fish Pastes

1,999. *Would you kindly supply me with the recipe for making potted meats and fish paste in small quantities to retail in cartons and weigh out?* (Macclesfield.)

You will, of course, understand that if the paste has to be kept for any length of time it must be put up in sealed glass jars and properly sterilised. In any case, there is such a variety of potted meats and fish pastes that unless one knows exactly what particular type and grade you require, it is impossible to make any useful suggestions.

Lemon Cheese

2,000. *Can you please supply us with a recipe for a good quality lemon cheese?* (Bradford.)

A typical formula for this class of product is as follows:

(A)	Wheat flour	7½ lb.
	Corn flour	7½ ,,
	Water	2 gal.
	Soak this overnight.	
(B)	White sugar	60 lb.
	Glucose	24 ,,
	Water	3 gal.

Boil (B) recipe to 245° F., and then add the following, without shutting off the steam:

White sugar	1½ lb.
Pectin	5 oz.
Dry yellow colour	⅟₇ ,,

Mix these ingredients well together, shake into the boiling sugar mixture through a sieve, stirring all the time. As soon as it is dissolved, add (A) recipe, to which 1 gal. of lemon juice should be added. Then add 4 lb. of butter and 6 eggs (which should be well beaten). At this stage the temperature should be about 175° to 180° F. Then in about 10 minutes gently bring the mixture to 212° F., and after about 3 to 4 minutes, bring to 218° F., and keep at this temperature for about 10 minutes.

Grapefruit Juice

2,001. *Can you please furnish any information regarding the beverage composed of grapefruit juice and barley water which is being used to a great extent in the British Isles?* (Los Angeles.)

We understand that the chief point in the preparation of grapefruit juice and barley water is the manner of incorporation of the barley so that fermentation is retarded as far as possible, because in the normal way barley provides excellent sustenance to the yeasts naturally present in these fruit juices.

The actual manner of preparation is essentially a technical matter and one which comes under the heading of "trade secrets".

In this connection we are not able to assist, and the matter should be put into the hands of a competent consulting chemist.

Research Association

2,002. *I would be much obliged if you can tell me if there is a Government Research Department dealing with the manufacture of jams. I have an idea that there is, but can't find the address.* (Kent.)

We think that you are referring to the British Association of Research for the Cocoa, Chocolate, Sugar Confectionery and Jam Trades, 2, Dalmeny Avenue, London, N. 7.

Fish and Meat Pastes

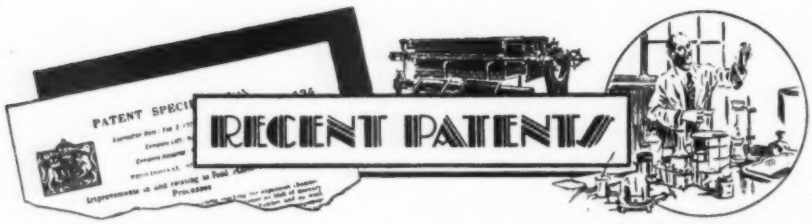
2,003. *I shall be greatly obliged to you if you will let me know if fish and meat to be made into pastes should be cooked previously, or would boiling the containers in the tank be sufficient?* (Cape Town.)

The first must, of course, before it is reduced to a paste be cooked, and mixed with the necessary spices, fillers, colouring matter and whatever other ingredients may be used. After reducing the whole batch to the required consistency, it is filled into containers, preferably by means of the special type of filling machine used for this purpose. Cap and then sterilise at 240° F., the time depending on the size of the container, which is usually about 40 minutes. No preservative is necessary, and, in fact, is not used.

Brawn

2,004. *I wonder if you could oblige me with a recipe for brawn, please?* (London.)

Reference should be made to the chapter dealing with this subject in Gerrard's book on Sausage-making and Small Goods Production.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

3651. MANDL, M.: Manufacture of sheets of comestible paste. February 6.
3804. HUNT, W. H.: Preparation of fish for filleting. February 7.
4301. KUPFERMANN, H.: Preparation for baking purposes. February 12.
4394. INDUSTRIAL PATENTS CORPORATION: Preparation of cheese. February 13. (United States, July 29, 1935.)
4427. BEACH, A. W.: Manufacture of preserved milk products. February 13.
4494. SOC. ANON. MUVIWA: Method of sterilising fruit juices. February 14. (France, February 15, 1935.)
4505. BORDEN CO.: Production of baked cereal products. February 14. (United States, February 14, 1935.)
4609. MCCALEB, A. G.: Meat-curing composition. February 15.
4793. MILK PROCESSES, INC.: Manufacture of milk products. February 17. (United States, March 15, 1935.)
5152. WILLMANN, J.: Treatment of cream. February 20.
5271. SHAW, C. R.: Variable speed gearing for power-driven food-preparing apparatus. February 21.
5319. SOC. ANON. VITABANA: Preparation, etc., of vitamin-containing foods. February 21. (France, February 21, 1935.)
5404. HAMPEL, K., and JAMES, E. W.: Means for utilising waste products in the manufacture of beet sugar. February 22.
6346. DEUTSCHE HYDRIERWERKE AKT.-GES.: Means for protecting goods from vermin. March 2. (Germany, March 2, 1935.)
6370. HALLETT, J. P., STEPHENS, G. A.: Production of bread, etc. March 3.
6396. SMIDT, K. J.: Apparatus for extraction of coffee, etc. March 3.
6588. DU PONT DE NEMOURS AND CO., E. I.: Stabilisation of animal, etc., fats, etc. March 4. (United States, March 5, 1935.)
6606. ALETE PHARMAZEUTISCHE PRODUKTE GES.: Manufacture of dried milk. March 4. (Germany, March 4, 1935.)

Complete Specifications Accepted

442,230. HELMKE, W. A. C.: Treatment of coffee beans with solvents for reducing the caffeine content.
442,294. BRITISH AUTOMATIC REFRIGERATORS, LTD., and GARROD, C. E.: Cold-plate structures for displaying comestibles or other perishable commodities.
442,644. VICKERS, H.: Manufacture of meat rolls. (Addition to 417,756.)
442,759. KELLOGG CO.: Processes of preparing food products and the food products produced thereby.
442,835. FROMM, J.: Box or packing device for preservatives.
442,892. KRAFT-PHENIX CHEESE CORPORATION: Methods of producing concentrated milk constituents.
443,091. STEINMANN, B., and HANDOWSKY, A.: Holders or containers for cosmetics, shaving soap, foodstuffs, and utility articles of various kinds.
443,425. BRUNTON, R. O.: Bread-making processes and machines.
443,528. MILCH-INDUSTRIE AKT.-GES.: Process for prolonging the stability of yoghourt or yoghourt-like milk products.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

438,072. **Food preparations.** SMITH, H. H., 46, Durham Road, West Wimbledon, London.
A food material which may be served with hot milk or water is prepared by softening by soaking and then rolling husked and cleaned wheat grains, then gently toasting them, allowing to cool and milling to a medium flour, which is mixed with purified suet and the mixture heated in a revolving pan at about 150° F. to allow the suet to penetrate into the wheat flour, sugar and flavouring being also added. The mixture of flour and suet may be heated for 10 minutes to 150° F., cocoa and slippery elm powder being added, the temperature is reduced to 120° F., and powdered glucose is added, then to 80° F., and the mixture is passed through a fine-meshed screen. The product may be obtained in semi-liquid form by adding full cream condensed milk and heating to 130° F. for 8 minutes.

438,093. **Preserving vegetable materials.** COE, M. R., 2947, Mills Avenue, Washington, U.S.A.
Plant foliage—*e.g.*, tobacco, hops, hay, and alfalfa, sage, thyme, catnip, tea mint, and other herbs—is subjected during the process of curing—*e.g.*, air curing—to the action of light having a wavelength above 4900Å. and excluding all light having a wavelength below that figure, and is then packed in containers of a material adapted to admit light having a wavelength above 4900Å. and exclude all light having a lower wavelength. Suitable light may be that having the colour of the chlorophyll pigments in plants and having a wavelength between 5270 and 6500Å., or orange-yellow light which excludes or absorbs all wavelength below 5000Å. Hay, alfalfa, tobacco, and other crops may be cured under suitable translucent hay-caps or in barns suitably protected. Foliage—*e.g.*, in the form of cigarettes or cigars—may be enclosed in a coloured wrapper having opaque binding material—*e.g.*, foil—attached to the ends and serving as a closing means for the wrapper.

438,509. **Packing foodstuffs.** JACKSON, L. MELLERSH-, 28, Southampton Buildings, Chancery Lane, London (Soc. de Credits Internationaux Soc. Anon., 1, Rue de la Tour de l'Ile, Geneva, Switzerland).
A food preparation which has been compressed to block form is wrapped in moistened parchment, artificial parchment, etc., and then dried, the wrapping shrinking on to the blocks, which may then be coated with paraffin, etc.

440,553. **Preservation of marine products.** H. C. WINS, Stadhouderslaan 18, The Hague, Holland.
Marine-animal fresh livers are finely comminuted in a mincing machine and dried by passing over hollow rollers of twin-roller driers internally heated by steam at 60 to 80 lb. pressure per sq. in. This treatment can be repeated several times, as it has been found to be without detriment to the keeping qualities of the livers. After the moisture content has been reduced to 35 to 45 per cent., the product is rapidly cooled to about 25° C. and immediately packed compactly (to reduce the amount of imprisoned air) into substantially airtight containers.

441,264. **Fruit-bottling scheme.** ELY FRUIT PRESERVING CO. (1932), LTD., Oldham Road, Rochdale, Lancs.
After filling the fruit into bottles or other containers, the latter are closed and placed in wirework baskets, which in turn are stacked in tiers in a truck or trolley. These are treated with live steam so as to raise the temperature to 180° to 185° F. over a period of 1 hour 30 minutes to 1 hour 45 minutes, the maximum temperature being maintained for 10 minutes. The cooked products are then transferred to another chamber, where they are cooled by a water spray and circulating air at a temperature not exceeding 60° C.

440,790. **Baked cereal food product.** LOOSE-WILES BISCUIT CO., Long Island City, Long Island, New York, U.S.A.
A breakfast food in the form of blocks, lozenges, or other shape not requiring preliminary crushing is built up from parallel cereal filaments, adjacent layers of which are arranged at angles to each other so as to produce a criss-cross structure of high porosity for milk or cream. A dough sheet is built up by superimposing closely spaced parallel filaments or layers of cereal dough, the filaments of any one layer being at an angle to the one below. Biscuits are cut from the sheet before baking. It is claimed that the criss-cross arrangement reduces the desiccating period, thus retaining the maximum flavour of the wheat.

LATEST TRADE MARKS

BIRD'S "VITA" CUSTARD POWDER. —565,011. **Custard powder.** ALFRED BIRD AND SONS, LTD., Devonshire Works, High Street, Deritend, Birmingham. March 11.

BOW BELLS.—556,427. **All goods in Class 42, which includes substances used as food or as ingredients in food, but not including margarine or canned or dried fruits, and not including any goods of a like kind to margarine or canned or dried fruits.** HENRY CHARLES CATER, EDWARD FRANK CATER, ERASTUS CATER, CLARENCE REGINALD CATER, and SIDNEY HAROLD CATER, trading as Cater Brothers, 37, Treby Street, Maplin Street, Mile End, London, E. 3. February 26. (Associated.)

Registration of this trade mark shall give no right to the exclusive use of the device of cows and of a pastoral scene.

BRIGHT SPOT. — 565,964. **Cherries.** BARTHES-ROBERTS, LTD., 59, Lant Street, Borough, London, S.E. 1. March 11.

CUP. — 565,742. **Condensed milk prepared in England.** CLEEVES, LTD., Cleevedale Park, 44, South Side, Clapham Common, London, S.W. 4. March 4. (Associated.)

DELIGHT.—551,619. **Flour for sale in Northern Ireland.** SPILLERS, LTD., 40, St. Mary Axe, London, E.C. 3. February 19. (Associated.)

User claimed from the year 1909. Section 21.

Registration of this trade mark shall give no right to the exclusive use of the word "Delight".

FARROW'S. — 565,068. **Canned garden peas (for food).** JOSEPH FARROW AND CO., LTD., Carlton Mills, Fletton Avenue, Peterborough. February 19. (Associated.)

Registration of this trade mark shall give no right to the exclusive use of the device of peas.

F. G. M.—565,881. **Fruits and vegetables (for food).** F. AND G. MIZEN, LTD., Culver's Farm, Culver's Avenue, Carshalton, Surrey. March 11. (Associated.)

FILBO.—563,698. **Substances used as food or as ingredients in food.** SUPREME MANUFACTURING COMPANY, LTD., 58, Weaman Street, Birmingham, 4. March 11. (By Consent.)

GOLDEN ACRES. — 565,590. **Butter.** DOMINION DAIRY COMPANY, LTD., Bicester Road, Aylesbury, Buckinghamshire. March 4. (Associated.)

Advertised before acceptance, the applicants alleging distinctiveness.

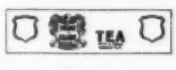
GOLDEN RANGE. — 555,607. **Canned fruits.** SCHUCKL AND COMPANY, INCORPORATED, 260, California Street, San Francisco, California, United States of America. March 11. (Associated.)

Registration of this trade mark shall give no right to the exclusive use of the words "Golden Range".

IBEX.—565,992. **Tea and coffee.** THE IPSWICH TEA AND COFFEE ASSOCIATION, LTD., 13, St. Peter's Street, Ipswich, Suffolk. March 11.

Registration No. 454,372 (2442) will be cancelled if and before the applicants' mark is registered.

INDU KANDE.—565,499. **Tea.** JOSEPH TETLEY AND CO., LTD., 49, Mansell Street, London, E. 1. February 26. (Associated.)



Registration of this trade mark shall give no right to the exclusive use of the word "Kande".

KELLEK.—565,917. **Bread, flour, and confectionery.** GEORGE HENRY KELLY, LTD., 58, Upper Beau Street, Liverpool, 5. February 19.

KINGMEAD. — 563,506. **Butter and cheese.** WILLIAM KINGHAM AND SONS, LTD., Queen's Wharf, Reading; 16, 17, and 18, West Street, Farnham; and 16, Eastcheap, London, E.C. 3. February 26.

MANZA. — 564,923. **Mussels.** HARRY MARTIN, 5, Park House, Rosslyn Road, East Twickenham, Middlesex. March 4. (By Consent.)

MONUMENT.—564,569. **All goods in Class 42, which includes substances used as food or as ingredients in food, but not including toffee, bread, shortbread, biscuits, cakes, condensed milk, evaporated milk, or cream, and not including any goods of a like kind to any of these excluded goods.** PERCY GILBERT JOHNSTON and CHARLES EDWARD FEAKS, trading as Johnston and Son, 36, 37, and 38, Botolph Lane, London, E.C. 3. March 11.

Registration No. 329,660 (1716) will be cancelled if and before the applicants' mark is registered.

OZONE. — 562,757. **Oysters.** STEWART ISLAND CANNERIES, LTD., 43, Clyde Street, Invercargill, Southland, New Zealand. March 11. (Associated.)

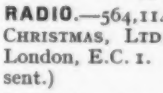
Registration of this trade mark shall give no right to the exclusive use of the device of an oyster.

PINEAPPLE GEMS.—561,822. **Canned preserved pineapple, the produce of Hawaii.** HAWAIIAN PINEAPPLE COMPANY, LTD., Iwelei Road, Iwelie, Territory of Hawaii, and 215, Market Street, San Francisco, California, United States of America. February 19. (By Consent.)

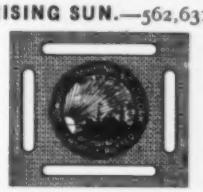
Registration of this trade mark shall give no right to the exclusive use of the words "Pineapple Gems".

RADIO.—564,114. **Cheese.** LOVELL AND CHRISTMAS, LTD., 12, West Smithfield, London, E.C. 1. February 26. (By Consent.)

RAGUS.—565,250. **Substances used as food or as ingredients in food, but not including boiled sweets and not including any goods of a like kind to boiled sweets.** FRUIT PRODUCTS, LTD., 193, Bedford Avenue, Slough, Buckinghamshire. February 26.



RISING SUN.—562,631. **Butter.** DOWDALL, O'MAHONEY AND CO., LTD., 4 to 8, Union Quay, Cork, Irish Free State. March 11.



RUNNERS. — 564,197. **Canned meat, canned fish, and canned fruit.** DANISH BACON COMPANY, LTD., 9 to 13, Cowcross Street, West Smithfield, London, E.C. 1. February 26.

STAG BRAND. — 563,085. **Condensed milk.** GEDYE AND SONS, LTD., 28-29, Nelson Street, Bristol. March 4. (By Consent.)

SUNNYBRAZ. — B 562,366. **Oranges.** CHARLES ORLANDO KENYON and JAIME ALMEIDA PAIVA, trading as Kenyon, Paiva et Cie, Ltd., 11, Rue Boa Vista, San Paulo, Brazil. February 19.

User claimed from June 15, 1932.

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

NEW COMPANIES

Andy's Candys, Limited. To carry on the bus. of mnfg. confectioners, etc. Nom. Cap.: £1,200. Permt. dirs.: C. Lovering Huggins, Windmere Hall, South Mimms, Herts; A. Lovering Huggins, 52, Monarch Court, Hampstead Garden Suburb, Middlesex.

Bird's Café (Clevedon), Limited. 1, Marine Parade, Clevedon, Somerset. To take over the bus. of a baker and hotel and café proprietor cd. on at Clevedon by J. T. Bird. Nom. Cap.: £5,000. Dirs.: J. T. Bird, 1, Marine Parade, Clevedon, Somerset (life dir.); E. J. Bird, 1, Marine Parade, Clevedon, Somerset; P. J. Bird, 1, Marine Parade, Clevedon, Somerset.

Blackpool Restaurant and Café Proprietors Company, Limited. To carry on bus. as refreshment contractors, etc. Nom. Cap.: £2,000. Dirs.: To be appointed by the subs. Subs.: S. Jenkinson, 37, Lincoln Road, Blackpool; E. Harden, 24, Thirlmere Road, Blackpool; W. S. Lines, 45, Talbot Road, Blackpool; C. P. Dewhirst, 44, Foxhall Road, Blackpool.

Bristol Wafers, Limited. To carry on the bus. of bakers, etc. Nom. Cap.: £2,000. Dirs.: To be appointed by the subs. Subs.: Sylvia C. Lewis, 26, Bibury Crescent, Henleaze, Bristol (clk.); T. W. Hyde, 90, Kingsland Road, St. Philip, Bristol (clk.).

Brodac, Limited. Bridgewater Chambers, 6, Brown Street, Manchester. To carry on the bus. of mnfrs. of and dlrs. in refrigerators, etc. Nom. Cap.: £2,000. Dirs.: W. Smith, 15, Robertson Street, Radcliffe, Lancs; A. E. Metcalfe, 40, Fog Lane, Didsbury, Manchester.

E. J. Cazenave and Sons, Limited. 57, Holmesdale Street, Cardiff. To carry on the bus. of dairymen, etc. Nom. Cap.: £2,000. Permt. dirs.: E. J. Cazenave, 6, Forrest Street, Cardiff.

Crucifix Cold Storage and Warehouse Company, Limited. To establish and carry on ice works, ice stores, etc. Nom. Cap.: £1,000. Dirs.: Not named. Subs.: R. C. Bartlett (solr.), J. W. F. Wyatt, both 27, John Street, W.C. 1.

Direct Importers (Mincing Lane), Limited. To mnfre., import, export, and deal in tea, coffee, etc. Nom. Cap.: £500. Permt. dirs.: E. C. E. Pinkerton, address not stated; L. W. Barber, Blackbrook House, Southborough, Bickley, Kent.

East India Spice Millers, Limited. To carry on the bus. of growers of and dlrs. in spices, etc. Nom. Cap.: £1,000. Dirs.: F. C. August, 908, London Road, Thornton Heath, Surrey; Mrs. G. August, same address.

Facchino's Purity Biscuits, Limited. Purity Works, Old Bromford Lane, Ward End, Birmingham. To take over the bus. cd. on as Facchino's Purity Biscuit Co. Nom. Cap.: £50,000. Dirs.: E. Facchino, Alton Lodge, Gravelly Hill North, Birmingham (gov. dir.); A. Facchino, Greenhill Lodge, Greenhill Road, Wylde Green; P. A. Facchino, Yewards, Jaffray Crescent, Erdington, Birmingham; D. Facchino, 210, Kingsbury Road, Erdington, Birmingham; J. Facchino, Alton Lodge, Gravelly Hill North, Birmingham.

Frank's Café, Limited. 18, Sudbury Park Parade, Wembley. To take over the bus. of a refreshment caterer and café proprietor cd. on by H. A. Allen. Nom. Cap.: £1,000. Dirs.: H. A. Allen, 24, Whitton Drive, Greenford; M. Jones, 45, St. Augustine's Avenue, South Croydon.

French's Stores, Limited. 24 to 27, Rood Lane, E.C. 3. To carry on the bus. of grocers, provision mchts., etc. Nom. Cap.: £3,000. Permt. ch. and mng. dir.: F. S. French, 7 and 9, Bute Street, South Kensington.

Gordon Bakeries, Limited. 8, Water Street, Bridge Street, Manchester, 3. To carry on the bus. of bakers, etc. Nom. Cap.: £1,000. Dirs.: H. Driver, 11, Johnson Street, Cheetham, Manchester; E. Driver, 30, Grosvenor Road, Crumpsall, Manchester.

James Hall (Manor House), Limited. To take over the bus. of grocers, provision mchts., etc., cd. on at Manor House, Cross Street, Woodhouse, Sheffield, as "James Hall and Son". Nom. Cap.: £2,000. Dirs.: J. Hall, Manor House, Cross Street, Woodhouse, Sheffield (permt. gov. dir.); J. K. Hall, 515, Stradbroke Road, Woodhouse, Sheffield; K. W. Hall, Manor House, Cross Street, Woodhouse.

H. R. Hennessey, Limited. 11, John Street, Sunderland. To carry on the bus. of mnfg., wholesale, and retail confectioners, tobacconists, etc. Nom. Cap.: £1,000. Dirs.: H. R. Hennessey, 8, Cedars Crescent, Sunderland; J. T. Miller, 22, Derwent Street, Sunderland; A. E. Ripley, 27, Hunter Terrace, Sunderland (two first-named are joint life gov. dirs.). Qual. of dirs.: Five shares.

Lapfia, Limited. Central Avenue, Covent Garden Market, W.C. 2. To carry on the bus. of importers and exporters of and dlrs. in fruit, vegetables, etc. Nom. Cap.: £5,000. Dirs.: W. J. Kemp, 22, High Road, Chiswick; F. I. Webb, 383, Aldborough Road, Seven Kings; P. Aelion, 26, Brockholme Road, Mossley Hill Road, Liverpool; A. D. Bramald-Kemp, 7, Chatsworth Road, Chiswick.

J. W. Lees and Company (Brewers), Limited. To take over the bus. cd. on at Greengate Brewery, Middleton Junction, as "J. W. Lees and Co." Nom. Cap.: £300,000. Dirs.: J. Lees-Jones, M.P., 18, Wilbraham Road, Fallowfield, Manchester; A. H. Hollingworth, Greenbank, Oak Drive, Colwyn Bay; R. W. T. Jones, The Homestead, Park Road, Timperley.

London Associated Wine Stores, Limited. To acquire any premises, off licences, etc., connected with the bus. of wine, beer, and spirit mchts., etc. Nom. Cap.: £20,000. Subs.: G. E. S. Bullard, Prospect Cottage, Pennington, Lymington, Hants; P. Rampon, Duncombe Hall, Staines, Middlesex.

J. J. N. Mackman, Limited. To take over the bus. of bakers and confectioners cd. on at Hull as "Geo. Reed and Mackman". Nom. Cap.: £20,000. Permt. gov. dir. and ch.: J. J. N. Mackman, Roseway, Newland Park, Hull. Sub.: N. Hobson, 16, St. Giles Croft, Beverley (solr.).

Maryland Confections, Limited. 42, Cross Street, Stratford, E. To carry on the bus. of mnfrs. of and dlrs. in confectionery, etc. Nom. Cap.: £300. Dirs.: W. J. Oldham, 4, Stopford Road, E. 13; W. H. Foay, 125, Katherine Road, E. 6.

J. L. Mason and Company, Limited. 1885, Pershore Road, Cotteridge, King's Norton, Birmingham. To carry on the bus. of wholesale and retail fishmongers, etc. Nom. Cap.: £1,000. Dirs.: A. Turner, 105, Middleton Hall Road, King's Norton, Birmingham (permt.); R. J. Spencer, Holly Villa, Water Orton, Birmingham.

Medforth's Dairies, Limited. To take over the bus. of wholesale dlrs. in dairy produce cd. on at 375, Anlaby Road, Hull, as "H. Medforth". Nom. Cap.: £2,000. Permt. dirs.: C. Medforth, 375, Anlaby Road, Hull; W. H. Medforth, Grange Farm, Brigham, E. Yorks; T. C. Medforth and A. Medforth, addresses not stated.

Midland Fruit Crush and Aerated Water Company, Limited. To carry on the bus. of mnfrs. and mchts. of and dlrs. in fruit cordials, aerated and mineral waters, etc. Nom. Cap.: £3,000.

Henry Mitchell and Sons, Limited. To take over the bus. of grocers and corn mchts. and seedsmen cd. on at South Lane, Holmfirth, Yorks, as Henry Mitchell and Sons. Nom. Cap.: £2,000. Dirs.: A. R. Sykes, 49, The Reins, Honley, Huddersfield (permt. gov. and mng. dir.); P. W. Knott, The Mount, Station Road, Holmfirth.

O'Connor's Free Houses, Limited. To carry on the bus. of brewers, maltsters, etc. Nom. Cap.: £5,000. Dirs.: Elizabeth M. O'Connor, Wayside, Menlove Gardens North, Liverpool; P. J. O'Connor, J. F. O'Connor, Wayside, Menlove Gardens North, Liverpool.

Olivers (London), Limited. 134, Shepherd's Bush Road, Hammersmith, W. 6. To carry on the bus. of bakers, confectioners, etc. Nom. Cap.: £3,000. Dirs.: F. E. Oliver (ch.), Mrs. M. Oliver, and Miss F. Oliver, all of West Heath House, West Heath Close, N.W. 3.

P. C. Products, Limited. To take over the bus. of pickle mnfrs. cd. on at 1a, Westminster Street, St. Ann's Well Road, Nottingham. Nom. Cap.: £500. Permt. dirs.: P. Coe, Monreith, Ruddington Lane, Wilford, Notts; W. S. Bates, 44, Pym Street, Nottingham.

J. W. Partington, Limited. To take over the bus. of wholesale potato mchts. and fruiters cd. on at Ramsbottom, Lancs, as "Fenton and Partington". Nom. Cap.: £2,000. Dir.: J. W. Partington, 677, Burnley Road, Crawshawbooth, Rawtenstall.

P. Pepper and Company, Limited. To carry on the bus. of bakers, confectioners, etc. Nom. Cap.: £500. Dirs.: To be appointed by the subs. Subs.: I. Goldberg (sec.) and L. M. Anekstein (solr.), both of 19, Ship Street, Brighton.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.